# Service Manual

Tektronix

# DPO7000, DPO70000 and DSA70000 Series Digital Phosphor Oscilloscopes

## 071-1740-02

This document applies to firmware version 1.0 and above.

**Warning**
The servicing instructions are for use by qualified personnel only. To avoid personal injury, do not perform any servicing unless you are qualified to do so. Refer to all safety summaries prior to performing service.

**www.tektronix.com**

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## Contacting Tektronix

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USA

For product information, sales, service, and technical support:

- In North America, call 1-800-833-9200.
- Worldwide, visit www.tektronix.com to find contacts in your area.

## Warranty 2

Tektronix warrants that this product will be free from defects in materials and workmanship for a period of one (1) year from the date of shipment. If any such product proves defective during this warranty period, Tektronix, at its option, either will repair the defective product without charge for parts and labor, or will provide a replacement in exchange for the defective product. Parts, modules and replacement products used by Tektronix for warranty work may be new or reconditioned to like new performance. All replaced parts, modules and products become the property of Tektronix.

In order to obtain service under this warranty, Customer must notify Tektronix of the defect before the expiration of the warranty period and make suitable arrangements for the performance of service. Customer shall be responsible for packaging and shipping the defective product to the service center designated by Tektronix, with shipping charges prepaid. Tektronix shall pay for the return of the product to Customer if the shipment is to a location within the country in which the Tektronix service center is located. Customer shall be responsible for paying all shipping charges, duties, taxes, and any other charges for products returned to any other locations.

This warranty shall not apply to any defect, failure or damage caused by improper use or improper or inadequate maintenance and care. Tektronix shall not be obligated to furnish service under this warranty a) to repair damage resulting from attempts by personnel other than Tektronix representatives to install, repair or service the product; b) to repair damage resulting from improper use or connection to incompatible equipment; c) to repair any damage or malfunction caused by the use of non-Tektronix supplies; or d) to service a product that has been modified or integrated with other products when the effect of such modification or integration increases the time or difficulty of servicing the product.

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# General Safety Summary

Review the following safety precautions to avoid injury and prevent damage to this product or any products connected to it.

To avoid potential hazards, use this product only as specified.

*Only qualified personnel should perform service procedures.*

### To Avoid Fire or Personal Injury

**Use Proper Power Cord.** Use only the power cord specified for this product and certified for the country of use.

**Connect and Disconnect Properly.** Do not connect or disconnect probes or test leads while they are connected to a voltage source.

**Ground the Product.** This product is grounded through the grounding conductor of the power cord. To avoid electric shock, the grounding conductor must be connected to earth ground. Before making connections to the input or output terminals of the product, ensure that the product is properly grounded.

**Observe All Terminal Ratings.** To avoid fire or shock hazard, observe all ratings and markings on the product. Consult the product manual for further ratings information before making connections to the product.

The inputs are not rated for connection to mains or Category II, III, or IV circuits.

Do not apply a potential to any terminal, including the common terminal, that exceeds the maximum rating of that terminal.

**Power Disconnect.** The power cord disconnects the product from the power source. Do not block the power cord; it must remain accessible to the user at all times.

**Do Not Operate Without Covers.** Do not operate this product with covers or panels removed.

**Do Not Operate With Suspected Failures.** If you suspect there is damage to this product, have it inspected by qualified service personnel.

**Avoid Exposed Circuitry.** Do not touch exposed connections and components when power is present.

**Do Not Operate in Wet/Damp Conditions.**

**Do Not Operate in an Explosive Atmosphere.**

**Keep Product Surfaces Clean and Dry.**

**Provide Proper Ventilation.** Refer to the manual's installation instructions for details on installing the product so it has proper ventilation.

## Symbols and Terms

**Terms in this Manual.** These terms may appear in this manual:

***WARNING.*** *Warning statements identify conditions or practices that could result in injury or loss of life.*

***CAUTION.*** *Caution statements identify conditions or practices that could result in damage to this product or other property.*

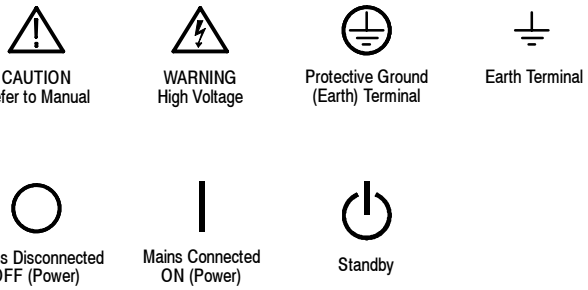
**Terms on the Product.** These terms may appear on the product:

DANGER indicates an injury hazard immediately accessible as you read the marking.

WARNING indicates an injury hazard not immediately accessible as you read the marking.

CAUTION indicates a hazard to property including the product.

**Symbols on the Product.** The following symbols may appear on the product:



# Service Safety Summary

Only qualified personnel should perform service procedures. Read this *Service Safety Summary* and the *General Safety Summary* before performing any service procedures.

**Do Not Service Alone.** Do not perform internal service or adjustments of this product unless another person capable of rendering first aid and resuscitation is present.

**Disconnect Power.** To avoid electric shock, switch off the instrument power, then disconnect the power cord from the mains power.

**Use Care When Servicing With Power On.** Dangerous voltages or currents may exist in this product. Disconnect power, remove battery (if applicable), and disconnect test leads before removing protective panels, soldering, or replacing components.

To avoid electric shock, do not touch exposed connections.

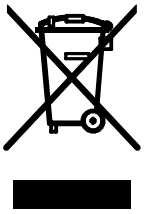
# Environmental Considerations

This section provides information about the environmental impact of the product.

## Product End-of-Life Handling

Observe the following guidelines when recycling an instrument or component:

**Equipment Recycling.** Production of this equipment required the extraction and use of natural resources. The equipment may contain substances that could be harmful to the environment or human health if improperly handled at the product's end of life. In order to avoid release of such substances into the environment and to reduce the use of natural resources, we encourage you to recycle this product in an appropriate system that will ensure that most of the materials are reused or recycled appropriately.



The symbol shown to the left indicates that this product complies with the European Union's requirements according to Directive 2002/96/EC on waste electrical and electronic equipment (WEEE). For information about recycling options, check the Support/Service section of the Tektronix Web site (www.tektronix.com).

**Battery Recycling.** This product may contain a Nickel Cadmium (NiCd) or lithium ion (Li-ion) rechargeable battery, which must be recycled or disposed of properly. Please properly dispose of or recycle the battery according to local government regulations.

**Mercury Notification.** This product uses an LCD backlight lamp that contains mercury. Disposal may be regulated due to environmental considerations. Please contact your local authorities or, within the United States, the Electronics Industries Alliance (www.eiae.org) for disposal or recycling information.

## Restriction of Hazardous Substances

This product has been classified as Monitoring and Control equipment, and is outside the scope of the 2002/95/EC RoHS Directive. This product is known to contain lead, cadmium, mercury, and hexavalent chromium.

# Preface

This manual contains service information for your instrument. Read this preface to learn how this manual is structured, the conventions it uses, and where to find additional supplemental information related to servicing this product.

You should also read the General and Service safety summaries before servicing the product.

## Manual Structure

This manual is divided into chapters, which are made up of related subordinate topics. These topics can be cross referenced as sections.

Be sure to read the introductions to all procedures. These introductions provide important information needed to do the service correctly, safely, and efficiently.

## Manual Conventions

This manual uses certain conventions that you should become familiar with before attempting service.

### Modules

Throughout this manual, any replaceable component, assembly, or part is referred to by the term *module.* A module is composed of electrical and mechanical assemblies, circuit boards, interconnecting cables, and user-accessible controls.

### Replaceable Parts

This manual refers to any field-replaceable assembly or mechanical part specifically by its name or generically as a replaceable part. In general, a replaceable part is any circuit board or assembly, such as the hard disk drive, or a mechanical part, such as the I/O port connectors, that is listed in the replaceable parts list of Chapter 10.

### Safety

Symbols and terms related to safety appear in the *Service Safety Summary* found at the beginning of this manual.

# Operating Information

# Operating Information

For information on installing, operating, and networking the instrument, refer to the *DPO7000, DPO70000 and DSA70000 Series Digital Phosphor Oscilloscopes Quick Start User Manual*. This manual is available on the product software CD that came with your oscilloscope, and on the Tektronix Web site (www.tektronix.com).

# Theory of Operation

# Theory of Operation

This section describes the electrical operation of the instrument. Figures 2–1 and 2–2, starting on page 2–4 show the module interconnections.

## Logic Conventions

The instrument contains many digital logic circuits. This manual refers to these circuits with standard logic symbols and terms. Unless otherwise stated, all logic functions are described using the positive-logic convention: the more positive of the two logic levels is the high (1) state, and the more negative level is the low (0) state. Signal states may also be described as "true" meaning their active state or "false" meaning their nonactive state. The specific voltages that constitute a high or low state vary among the electronic devices.

## Module Overviews

Module overviews describe the basic operation of each functional circuit block as shown in figures 2–1 and 2–2, starting on page 2–4.

A Microsoft Windows processor system is the primary controller of the instrument. The instrument features an XGA resolution flat-panel display, a transparent touch screen, and a front-panel with direct access to commonly used instrument functions. You can also make complete use of the instrument with a mouse and keyboard.

### Input Signal Path

A signal enters the instrument through a connection to the input connector on the front panel.

**Acquisition Board.** The acquisition board conditions the input signals and converts them to digital signals, then processes the data into a form that is handled by the display system. The acquisition system includes the multi–source trigger system, a timebase, and acquisition control circuitry, as well as a calibration reference system for internal calibration purposes. The acquisition board is located in the bottom compartment of the instrument. All input channels feature a probe interface system with the ability to recognize the probe type for proper unit display and for calibration out to the probe tip.

**Processor System.** The processor system contains a processor board with microprocessor that controls the entire instrument. The basic configuration supports input channels, provides an external trigger input, a trigger output, and a probe compensation output.

Each acquisition channel is equipped with a processor that uses its own host interface which communicates with the command interface processor.

## Display Panel

Waveforms and menus are displayed on a color, active-matrix LCD display with touch panel.

**Display System.** Text and menu image information from the Windows system is merged with the waveform images and processed by the display circuitry. The display system sends the combined graphical image to the active-matrix LCD display.

**Touch Panel.** The touch information from the touch screen is processed by a Windows driver, actively placing the pointer at the touched location. Actions from a mouse and actions from the touch panel are interchangeable, and treated alike by the user interface software.

## Front Panel

Front-panel push-button and knob encoder switches are read by an embedded micro controller, which sends the button and knob change information to the Windows system over the Universal Serial Bus path.

**ON/STBY.** The ON/STBY switch in the lower left corner of the instrument front is connected directly to the μATX board which, in turn, controls the off-line power supply system. This allows Windows to control the power based on standard Windows operating behavior.

## μATX Board

The μATX board provides standard Windows functionality and I/O port interfaces on the left side panel. This includes RS-232, Centronics, and Ethernet ports, as well as four USB ports, including a USB2.0 port placed in the lower right corner of the instrument front. The μATX board receives input from the Front Panel and Touch Panel, and implements the appropriate changes. Video display data, containing waveform and graphical menu information, is transferred to the Windows system through the PCI bus interface.

The hard drive is connected to the μATX board through the SATA interface, while the CD/DVD is connected to the Windows system through the IDE parallel interface. The hard drive and CD provide access to stored waveform data and software to customize your instrument with your measurement needs.

### Interface Board

This board coordinates the flow of data through the Windows PCI port from the various devices that communicate with the µATX system. The devices include the display system, GPIB, TekLink, and a direct DMA path to the acquisition system.

The GPIB permits external control of the instrument both as a controller and as a slave device.

The acquisition system analog power supplies are generated on this interface board, from DC voltages supplied by the off-line power supply unit.

### Power System

The off-line power supply is a switching power converter with active power factor control. It auto detects the line voltage. It supplies power to all of the circuitry in the instrument.

No switch completely disconnects the line power from the instrument. The ON/STBY switch controls the power to the instrument through the µATX board circuitry. When in the "power off" condition, there is still a low power standby circuit to allow the system to monitor the ON/STBY switch.

### Fans

For cooling, the instrument fans draw air out of the instrument, for a negatively pressured instrument. The fans are controlled by an embedded processor on the acquisition board and are regulated by monitoring the temperature of the acquisition board circuitry. Cooling air enters the instrument through specific locations on the covers, where it flows directly over the heat sinks of each high wattage component.

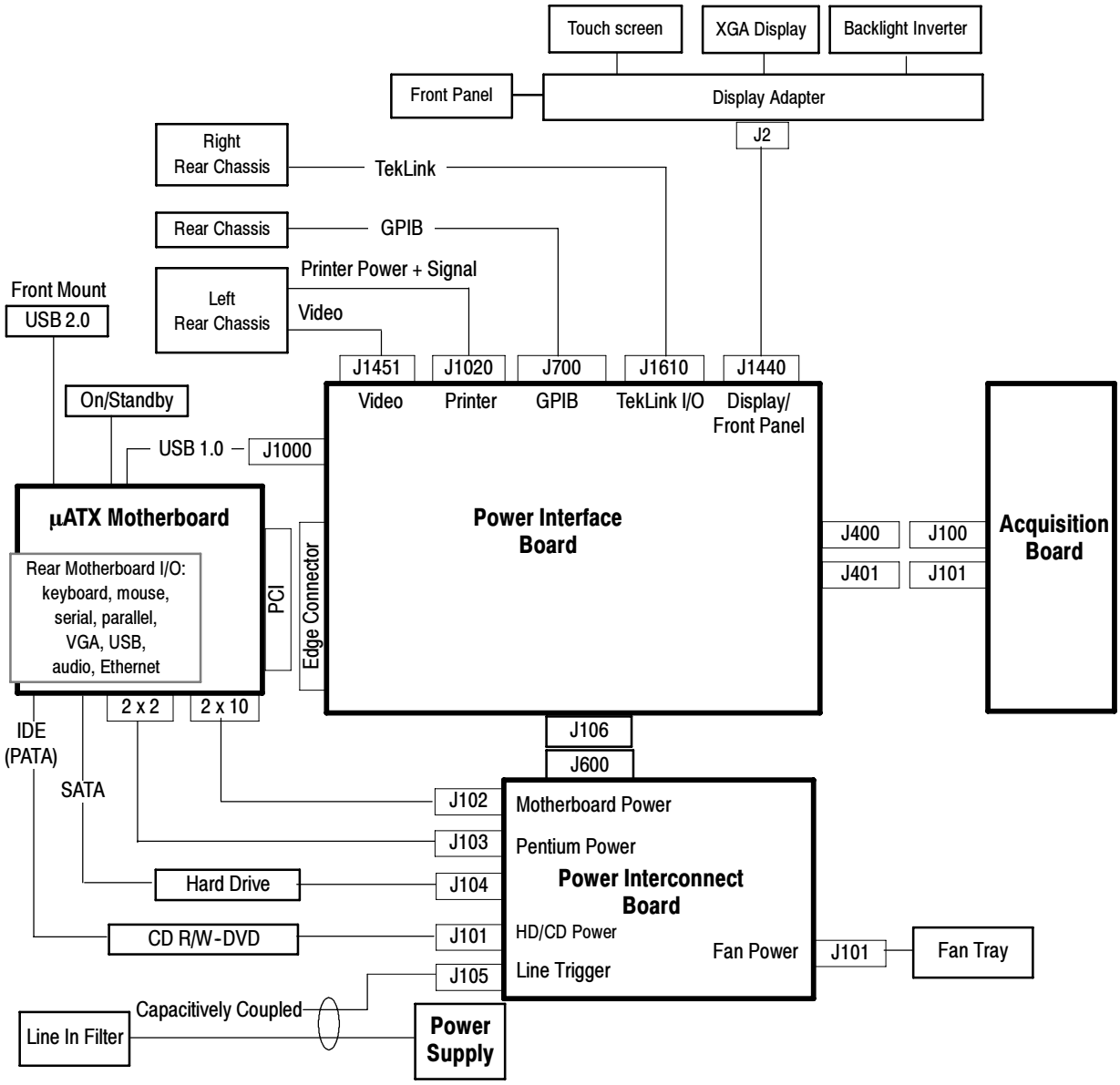



**Figure 2-1: DPO7000 Series block diagram**

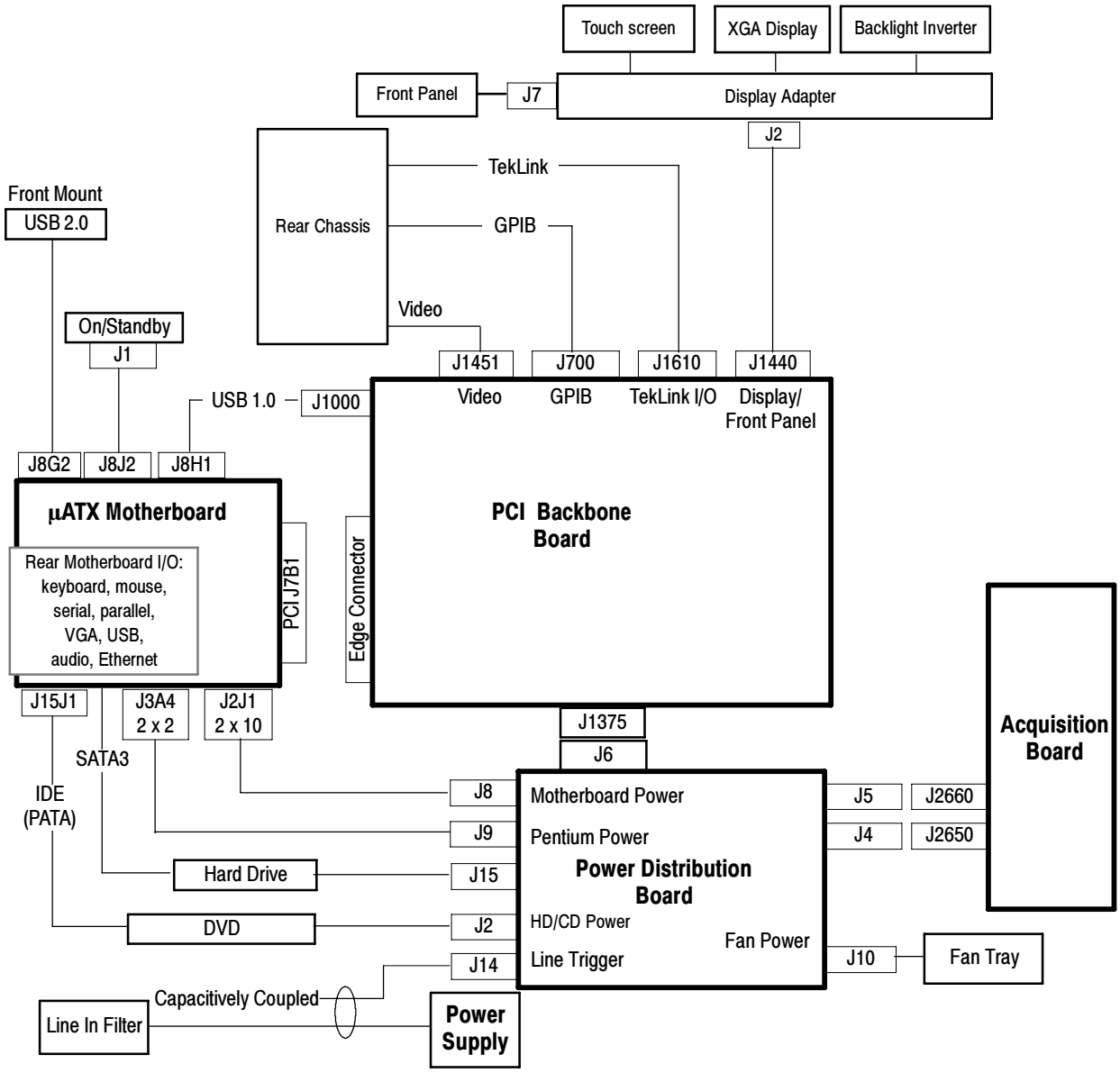



**Figure 2-2: DPO70000 and DSA70000 Series block diagram**

# Adjustment Procedures

# Adjustment Procedures

This chapter contains information about instrument adjustment.

## Adjustment Interval

The voltage and timing references inside the instrument are very stable over time and should not need routine adjustment.

If the instrument fails performance tests (refer to the *DPO7000, DPO70000 and DSA70000 Series Digital Phosphor Oscilloscopes Specifications and Performance Verification* manual), then adjustment may be required.

If periodic calibration is one of your requirements, a general rule is to verify performance and make adjustments (only if needed) every 2000 hours of operation or once a year if the instrument is used infrequently.

## Adjustment After Repair

After removal and replacement of a module you must perform the Performance Verification procedure, found in the *DPO7000, DPO70000 and DSA70000 Series Digital Phosphor Oscilloscopes Specifications and Performance Verification* manual, which was provided with the instrument. This manual is also available on the Tektronix Web site (www.tektronix.com).

If the instrument fails the Performance Verification tests, it must be returned to Tektronix for calibration.

## Adjustment

If your instrument requires adjustment, adjustment must be performed by a Tektronix Service Center. See Contacting Tektronix, following the title page in this manual, for information on contacting Tektronix Service Support.

# Maintenance

# Maintenance

This section contains the information needed to do periodic and corrective maintenance on the instrument. The following subsections are included:

- Preventing ESD — General information on preventing damage by electrostatic discharge.
- *Inspection and Cleaning* — Information and procedures for inspecting the instrument and cleaning its external and internal modules.
- *Removal and Installation Procedures* — Procedures for the removal of defective modules and replacement of new or repaired modules. Also included is a procedure for disassembly of the instrument for cleaning.
- *Troubleshooting* — Information for isolating and troubleshooting failed modules. Included are instructions for operating the instrument diagnostic routines and troubleshooting trees. Most of the trees make use of the internal diagnostic routines to speed fault isolation to a module.
- Repackaging Instructions — Information on returning an instrument for service.

## Preventing ESD

Before servicing this product, read the *Service Safety Summary* and *Introduction* at the front of the manual and the ESD information below.

***CAUTION.*** *Static discharge can damage any semiconductor component in this instrument.*

When performing any service which requires internal access to the instrument, adhere to the following precautions to avoid damaging internal modules and their components due to electrostatic discharge (ESD):

1. Minimize handling of static-sensitive circuit boards and components.
2. Transport and store static-sensitive modules in their static protected containers or on a metal rail. Label any package that contains static-sensitive boards.
3. Discharge the static voltage from your body by wearing a grounded antistatic wrist strap while handling these modules. Do service of static-sensitive modules only at a static-free work station.

4. Nothing capable of generating or holding a static charge should be allowed on the work station surface.
5. Handle circuit boards by the edges when possible.
6. Do not slide the circuit boards over any surface.
7. Avoid handling circuit boards in areas that have a floor or work-surface covering capable of generating a static charge.

## Inspection and Cleaning

*Inspection and Cleaning* describes how to inspect for dirt and damage. It also describes how to clean the exterior and interior of the instrument. Inspection and cleaning are done as preventive maintenance. Preventive maintenance, when done regularly, may prevent instrument malfunction and enhance its reliability.

Preventive maintenance consists of visually inspecting and cleaning the instrument and using general care when operating it.

How often to do maintenance depends on the severity of the environment in which the instrument is used. A proper time to perform preventive maintenance is just before instrument adjustment.

### General Care

The cabinet helps keep dust out of the instrument and should normally be in place when operating the instrument.

### Interior Cleaning

Use a dry, low-velocity stream of air to clean the interior of the chassis. Use a soft-bristle, non-static-producing brush for cleaning around components. If you must use a liquid for minor interior cleaning, use a 75% isopropyl alcohol solution and rinse with deionized water.

***WARNING.*** *To avoid electric shock or damage to the instrument, remove instrument power. Before performing any procedure that follows, power down the instrument and disconnect it from line voltage.*

### Exterior Cleaning

Clean the exterior surfaces of the chassis with a dry lint-free cloth or a soft-bristle brush. If any dirt remains, use a cloth or swab dipped in a 75% isopropyl alcohol solution. Use a swab to clean narrow spaces around controls and connectors. Do not use abrasive compounds on any part of the chassis that may damage the chassis.

Clean the On/Standby switch using a dampened cleaning towel. Do not spray or wet the switch itself.

***CAUTION.*** *Avoid the use of chemical cleaning agents which might damage the plastics used in this instrument. Use only deionized water when cleaning the menu buttons or front-panel buttons. Use a 75% isopropyl alcohol solution as a cleaner and rinse with deionized water. Before using any other type of cleaner, consult your Tektronix Service Center or representative.*

**Inspection — Exterior.** Inspect the outside of the instrument for damage, wear, and missing parts, using Table 4–1 as a guide. Immediately repair defects that could cause personal injury or lead to further damage to the instrument.

**Table 4-1: External inspection checklist**

| Item | Inspect for | Repair action |
|---|---|---|
| Cabinet, front panel, and cover | Cracks, scratches, deformations, damaged hardware | Repair or replace defective module |
| Front-panel knobs | Missing, damaged, or loose knobs | Repair or replace missing or defective knobs |
| Connectors | Broken shells, cracked insulation, and deformed contacts. Dirt in connectors | Repair or replace defective modules. Clear or wash out dirt |
| Carrying handle, and cabinet feet | Correct operation | Repair or replace defective module |
| Accessories | Missing items or parts of items, bent pins, broken or frayed cables, and damaged connectors | Repair or replace damaged or missing items, frayed cables, and defective modules |

## Flat Panel Display Cleaning

The display is a soft plastic display and must be treated with care during cleaning.

***CAUTION.*** *Improper cleaning agents or methods can damage the flat panel display.*

*Avoid using abrasive cleaners or commercial glass cleaners to clean the display surface.*

*Avoid spraying liquids directly on the display surface.*
*Avoid scrubbing the display with excessive force.*

Clean the flat panel display surface by gently rubbing the display with a clean-room wipe (such as Wypall Medium Duty Wipes, #05701, available from Kimberly-Clark Corporation).

If the display is very dirty, moisten the wipe with distilled water or a 75% isopropyl alcohol solution and gently rub the display surface. Avoid using excess force or you may damage the plastic display surface.

***CAUTION.*** *To prevent getting moisture inside the instrument during external cleaning, use only enough liquid to dampen the cloth or applicator.*

**Inspection — Interior.** To access the inside of the instrument for inspection and cleaning, refer to the *Removal and Installation Procedures* in this section.

Inspect the internal portions of the instrument for damage and wear, using Table 4–2 as a guide. Defects should be repaired immediately.

If any circuit board is repaired or replaced, you must perform the Performance Verification procedure, found in the *DPO7000 Series Digital Phosphor Oscilloscopes Specifications and Performance Verification* manual, which was provided with the instrument. This manual is also available on the Tektronix Web site (www.tektronix.com). If the instrument fails the Performance Verification tests, it must be returned to Tektronix for calibration.

***CAUTION.*** *To prevent damage from electrical arcing, ensure that circuit boards and components are dry before applying power to the instrument.*

**Table 4-2: Internal inspection checklist**

| Item | Inspect for | Repair action |
|---|---|---|
| Circuit boards | Loose, broken, or corroded solder connections. Burned circuit boards. Burned, broken, or cracked circuit-run plating. | Remove and replace damaged circuit board. |
| Resistors | Burned, cracked, broken, blistered condition. | Remove and replace damaged circuit board. |
| Solder connections | Cold solder or rosin joints. | Resolder joint and clean with isopropyl alcohol. |
| Capacitors | Damaged or leaking cases. Corroded solder on leads or terminals. | Remove and replace damaged circuit board. |

**Table 4-2: Internal inspection checklist (Cont.)**

| Item | Inspect for | Repair action |
|---|---|---|
| Semiconductors | Loosely inserted in sockets. Distorted pins. | Firmly seat loose semiconductors. Remove devices that have distorted pins. Carefully straighten pins (as required to fit the socket), using long-nose pliers, and reinsert firmly. Ensure that straightening action does not crack pins, causing them to break off. |
| Wiring and cables | Loose plugs or connectors. Burned, broken, or frayed wiring. | Firmly seat connectors. Repair or replace modules with defective wires or cables. |
| Chassis | Dents, deformations, and damaged hardware. | Straighten, repair, or replace defective hardware. |

**Cleaning Procedure — Interior.** To clean the instrument interior, do the following steps:

1. Blow off dust with dry, low-pressure, deionized air (approximately 9 psi).
2. Remove any remaining dust with a lint-free cloth dampened in isopropyl alcohol (75% solution) and rinse with warm deionized water. (A cotton-tipped applicator is useful for cleaning in narrow spaces and on circuit boards.)

***STOP****. If, after doing steps 1 and 2, a module is clean upon inspection, skip the remaining steps.*

3. If steps 1 and 2 do not remove all the dust or dirt, the instrument may be spray washed using a solution of 75% isopropyl alcohol by doing steps 4 through 8.
4. Gain access to the parts to be cleaned by removing easily accessible shields and panels (see *Removal and Installation Procedures*).
5. Spray wash dirty parts with the isopropyl alcohol and wait 60 seconds for the majority of the alcohol to evaporate.
6. Use hot (120 °F to 140 °F) deionized water to thoroughly rinse them.

7. Dry all parts with low-pressure, deionized air.
8. Dry all components and assemblies in an oven or drying compartment using low-temperature (125 °F to 150 °F) circulating air.

**Lubrication.** There is no periodic lubrication required for this instrument.

# Removal and Installation Procedures

This subsection contains information about removal and installation of all modules.

## Preparation

***WARNING.*** *Before doing this or any other procedure in this manual, read the safety summaries found at the beginning of this manual. Also, to prevent possible injury to service personnel or damage to the instrument components, read* Installation *in Section 2, and* Preventing ESD *in this section.*

This subsection contains the following items:

- This preparatory information that you need to properly do the procedures that follow.
- List of tools required to remove and disassemble all modules.
- Procedures for removal and reinstallation of the modules.

***WARNING.*** *Before doing any procedure in this subsection, disconnect the power cord from the line voltage source. Failure to do so could cause serious injury or death.*

***NOTE****. Read* Equipment Required *for a list of the tools needed to remove and install modules in this instrument. See Table 4–3, on page 4–8.*
*Read the cleaning procedure before disassembling the instrument for cleaning.*

**Equipment Required.** Most modules in the instrument can be removed with a screwdriver handle mounted with a size T-15, Torx® screwdriver tip. All equipment required to remove and reinstall the modules is listed in Table 4–3.

**Table 4-3: Tools required for module removal**

| Item no. | Name | Description | General Tool number |
|---|---|---|---|
| 1 | Screwdriver handle | Accepts Torx-driver bits | 620-440 |
| 2 | T-10 Torx tip | Used for removing instrument. screws Torx-driver bit for T-10 size screw heads | 640-235 |
| 3 | T-15 Torx tip | Used for removing most instrument screws. Torx-driver bit for T-15 size screw heads | 640-247 |
| 4 | $^{1}/_{8}$ inch flat-bladed screw-driver | Screwdriver for unlocking cable connectors | Standard tool |
| 5 | #0 Phillips screwdriver | Screwdriver for removing small phillips screws, CDRW & hard drive | Standard tool |
| 6 | Angle-Tip Tweezers | Used to remove front panel knobs | Standard tool |
| 7 | $^{3}/_{16}$ inch open-end wrench | Used to remove nut posts | Standard tool |
| 8 | $^{9}/_{32}$ inch open-end wrench | Used to remove nut posts | Standard tool |
| 9 | MA-800G Soldering Aid | Used to remove the front panel trim | Standard tool |

## Module Removal

DPO7000 Series: The removal of most of the modules is a straightforward process, and can be determined by a quick study of Figure 4–1 and the exploded diagrams in the *Replaceable Parts List* (Section 5). Table 4–4 lists what to remove to access the modules.

DPO70000 and DSA70000 Series: The removal of most of the modules is a straightforward process, and can be determined by a quick study of Figure 4–2 and the exploded diagrams in the *Replaceable Parts List* (Section 5). Table 4–5 lists what to remove to access the modules.

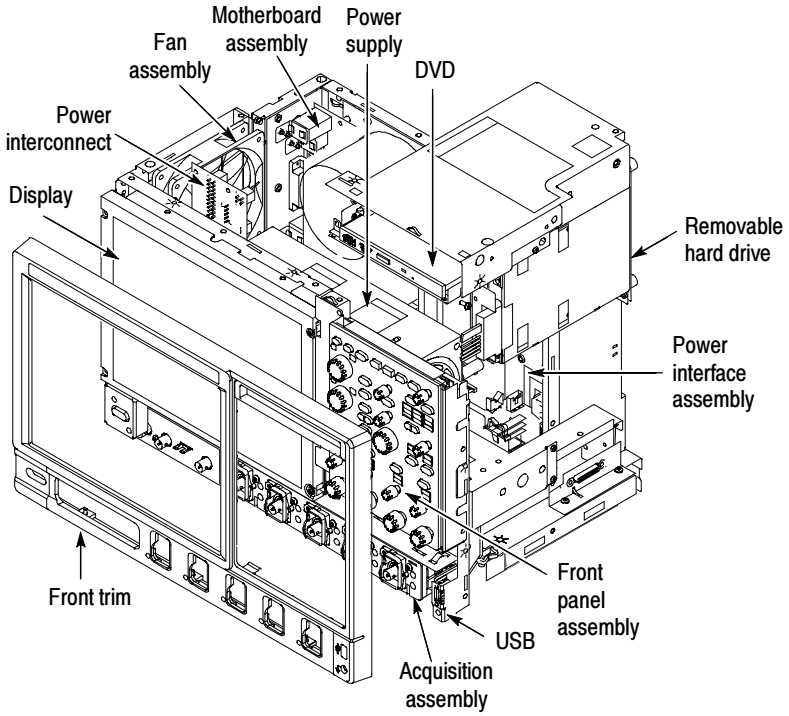



**Figure 4-1: DPO7000 Series module locations**

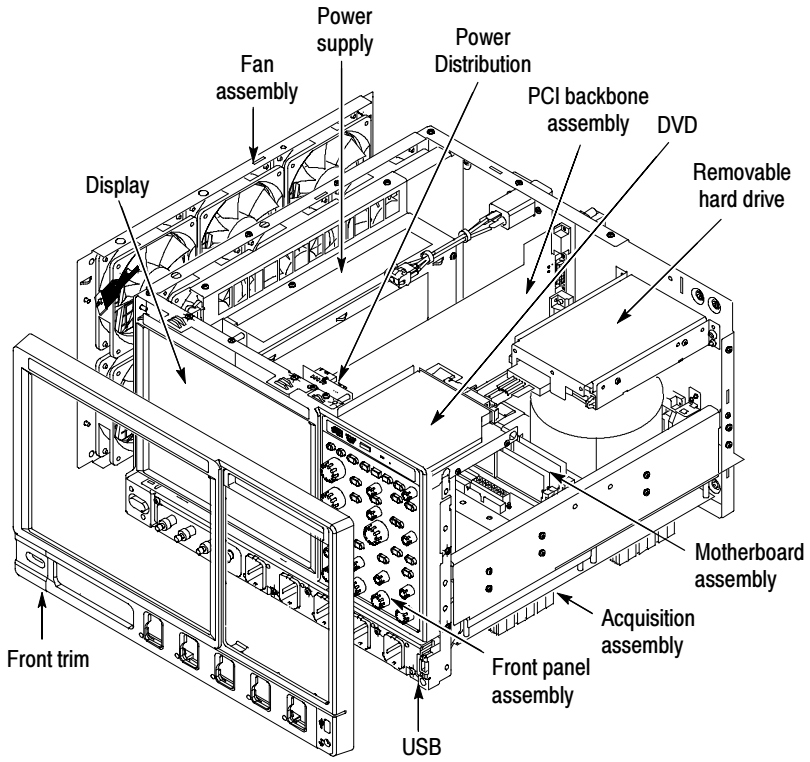



**Figure 4- 2: DPO70000 and DSA70000 Series module locations**

**Table 4-4: DPO7000 Series module removal**

| To Remove | You must first remove | | | | | |
|---|---|---|---|---|---|---|
| | Trim & covers | DVD | Hard drive | Acquisition assembly | Power supply | Power interface |
| Front panel | X | | | | | |
| Display | X | | | | | |
| Front USB | X | | | | | |
| DVD | X | | | | | |
| Hard drive | X | X | | | | |
| μATX motherboard | X | | | X | | X |
| Power interface | X | | | X | | |
| Acquisition assembly | X | | | | | |
| Power supply | X | X | X | | | |
| Power interconnect | X | X | X | | X | |
| Fan assembly | X | | | | | |
| Power button | X | | | | | |

**Table 4-5: DPO70000 and DSA70000 Series module removal**

| To Remove | You must first remove | | | | | | |
|---|---|---|---|---|---|---|---|
| | Trim & cosmetic covers | ESD (electrostatic discharge) Covers | DVD | Hard drive | Acquisition assembly | Power supply | PCI backbone |
| Front panel and Display | X | | | | | | |
| Front USB | X | Bottom | | | X | | |
| DVD | X | Top | | | | | |
| Hard drive cable and bracket | X | Top | | | | | |
| μATX motherboard | X | Top | | | | | X |
| PCI backbone | X | Top | | | | | |
| Acquisition assembly | X | Bottom | | | | | |
| Power supply | X | Top | | | | | |
| Power distribution | X | Both | | | X | X | X |
| Fan assembly | X | | | | | | |
| Power button | X | Bottom | | | | | |

## µATX and Power Interface Removal, DPO7000 Series

Removal of the µATX motherboard and the Power Interface assembly is a complex process. To access or replace either one, remove both the µATX motherboard and the Power Interface board as an assembly. This procedure assumes the Acquisition board has been removed.

1. Working from the top of the instrument, unplug the cables connecting the µATX and Power interface boards to other parts of the instrument. Note where each cable connects.
2. Remove the screw securing the µATX board to the chassis on the right side of the instrument, near the TekLink connector.
3. Remove the eight screws securing the µATX board to the chassis through the back of the instrument.
4. Remove the three screws securing the µATX board to the chassis on the left side of the instrument.
5. Position the instrument on its back, with the bottom facing you.
6. Remove the three screws securing the Power Interface assembly to the chassis, along the top edge of the assembly.
7. Pull the µATX/Power Interface assembly out of the instrument (See Figure 4–3). It may take some force to pull it free. Use a soldering aid to pry the assembly free of the connectors near the top corners of the assembly, if necessary.

**Figure 4- 3: Removing the µATX/Power Interface assembly**

8. Install the µATX/Power Interface assembly by performing these steps in reverse.

# Troubleshooting

***CAUTION.*** *Before performing this or any other procedure in this manual, read the* General Safety Summary *and* Service Safety Summary *found at the beginning of this manual.*

*To prevent possible injury to service personnel or damage to electrical components, please read* Preventing ESD *on page 4–1*.

This section contains information and procedures designed to help you isolate faults to a module.

This section requires that service personnel have the appropriate skills to work on this instrument, including PC troubleshooting and Microsoft Windows operating system skills. Details of PC and Windows operation and service are not in this manual.

For assistance, contact your local Tektronix Service Center.

## Service Level

This subsection contains information and procedures designed to help you isolate faulty modules in the instrument. If a module needs to be replaced, follow the *Removal and Installation Procedures* located in this section.

## Check for Common Problems

Use Table 4–6 to quickly isolate possible failures. The table lists problems and possible causes. The list is not exhaustive, but it may help you eliminate a problem that is quick to fix, such as a blown fuse or loose cable.

**Table 4- 6: Failure symptoms and possible causes**

| Symptom | Possible cause(s) |
|---|---|
| Instrument will not power on | ■ Power cord not plugged in<br>■ Faulty power supply<br>■ Faulty power interconnect board |
| Front panel light comes on (instrument powers on), but one or more fans will not operate | ■ Faulty fan cable<br>■ Defective fan assembly<br>■ Faulty power supply<br>■ Faulty μATX Motherboard<br>■ Faulty CPU<br>■ μATX Motherboard power problem |
| Hard disk drive related symptoms | ■ Defective hard disk drive<br>■ Incorrect hard disk type selected in the BIOS setup<br>■ Replaceable hard disk drive not installed<br>■ Power supply failure<br>■ Corrupted BIOS module firmware, reinstall firmware<br>■ Loose cable<br>■ Corrupted OS image |
| DVD-ROM related symptoms | ■ Defective CDRW-ROM<br>■ Defective CDRW-ROM drive cable<br>■ Defective CDRW-ROM board<br>■ Incorrect CDRW-ROM configuration in the BIOS setup |

**Table 4-6: Failure symptoms and possible causes (Cont.)**

| Symptom | Possible cause(s) |
|---|---|
| Flat panel display blank | ■ Video adapter set to Integrated (connect monitor to MicroATX VIDEO port, enter BIOS, set Video Adapter = PCI)<br>■ BIOS setting not Advance > Video Configuration > Primary Video Adapter = PCI<br>■ Defective cable from display adapter board to power interface board<br>■ Defective cable from inverter board to display adapter board<br>■ Defective cable from inverter board to backlighting display lamp<br>■ Defective backlighting display lamp<br>■ Faulty display<br>■ Faulty power interface board<br>■ Faulty power interconnect board<br>■ Faulty inverter board<br>■ Faulty display adapter board |
| BIOS error messages | ■ Refer to the BIOS error message tables starting on page 4-27 |

## Equipment Required

You will need a digital voltmeter to check power supply voltages, as described on page 4–20.

## Fault Isolation Procedure

Follow the primary troubleshooting tree in Figure 4–4 for fault isolation. This tree calls for you to run the diagnostics programs, and check for BIOS errors.

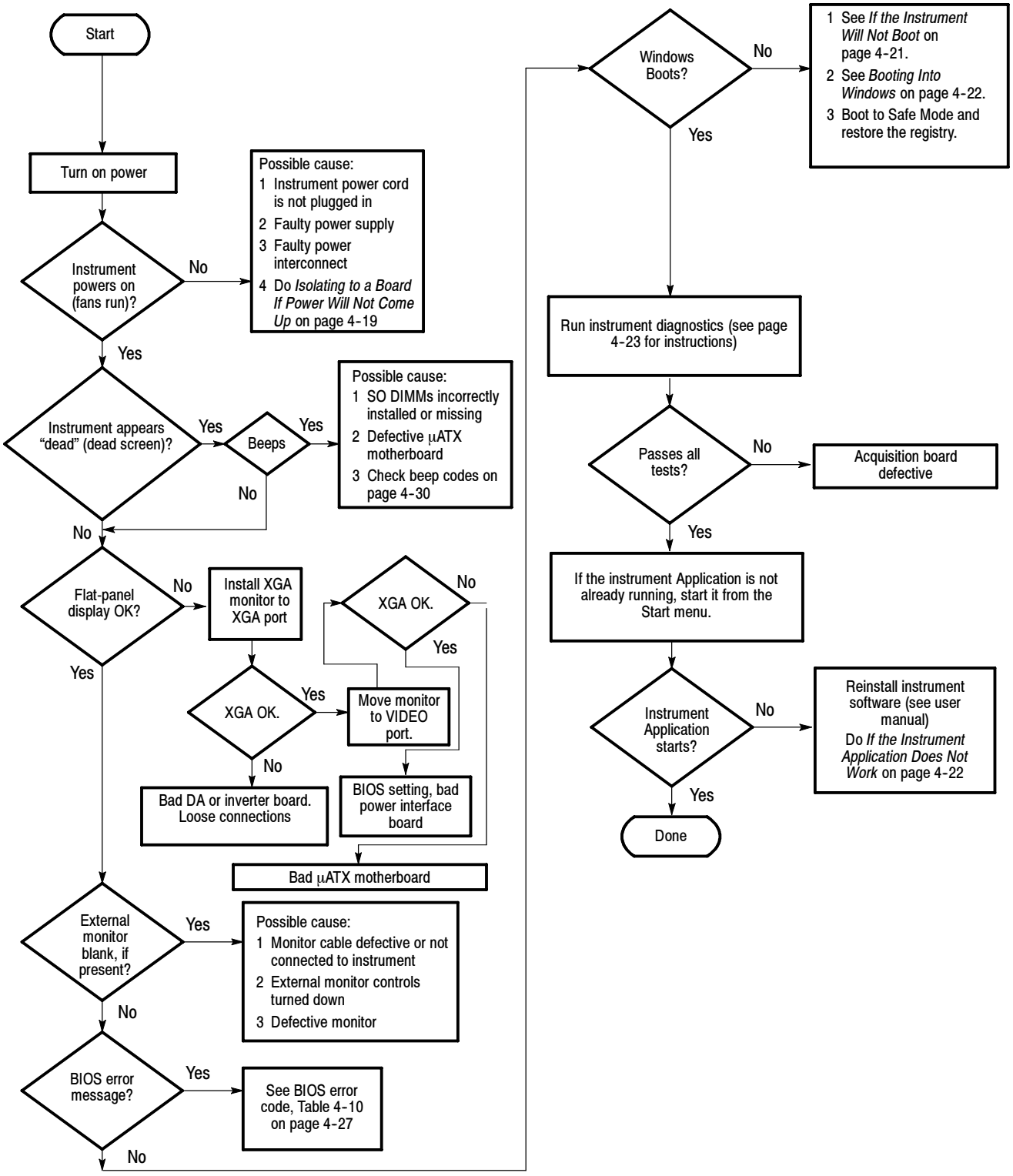



**Figure 4-4: Primary troubleshooting tree**

### Isolating to a Board if Power Will Not Come Up, DPO7000 Series

If the instrument is plugged in, but is not on (power supply is in standby mode), a red light (see Figure 4–5 for its location) is visible through the right side of the instrument. If the instrument is on, the red light is off.

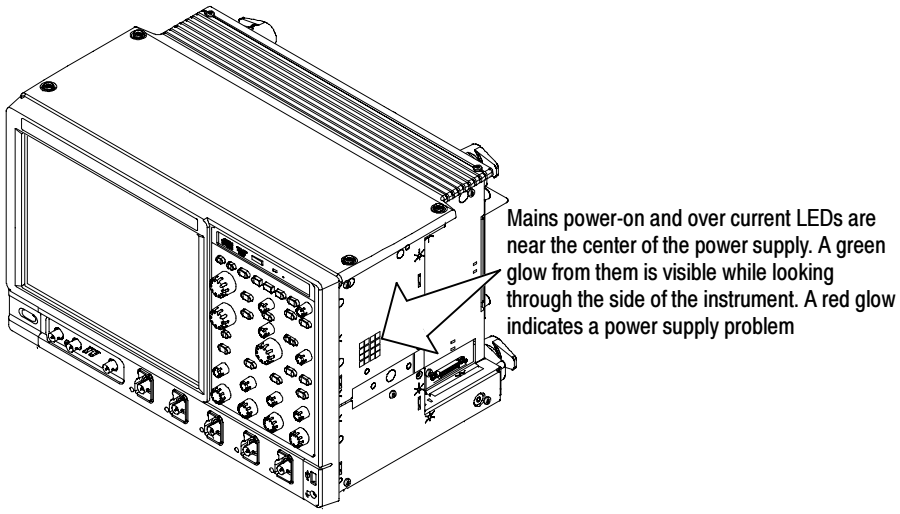

Mains power-on and over current LEDs are near the center of the power supply. A green glow from them is visible while looking through the side of the instrument. A red glow indicates a power supply problem

**Figure 4-5: Location of power-on and over current LEDs**

**Table 4-7: Power supply LEDs**

| LED | Supply voltage | Description |
|---|---|---|
| DS200 | +15VA | Green when supply is operating within tolerance. |
| DS201 | +5VA | Green when supply is operating within tolerance. |
| DS202 | NA | Red if any of the supplies (+15VA, +5VA, +1.8VD, -15VA, and -5VA) are out of tolerance. |
| DS203 | -5VA | Green when supply is operating within tolerance. |
| DS204 | -15VA | Green when supply is operating within tolerance. |
| DS330 | +1.8VD | Green when supply is operating within tolerance. |

If the instrument is plugged in and not in Standby mode, a red light (see Figure 4–5) means that there is a problem with one of the power supplies.

Remove boards one at a time to locate a fault (the Display board, Acquisition board, Power interface board, and the MicroATX board). If this does not identify the problem, check the IEC power cable.

If this process did not correct the problem, replace the power supply.

### Isolating to a Board if Power Will Not Come Up, DPO70000 and DSA70000 Series

Remove boards one at a time to locate a fault (the Display board, Acquisition board, Power distribution board, PCI backbone board, and the MicroATX board). If this does not identify the problem, check the IEC power cable.

If this process did not correct the problem, replace the power supply.

### Checking the Power Supply Voltages

To check the power supply voltages, power on the instrument and connect the reference lead of a digital voltmeter to chassis ground, such as the top of the power supply.

Attach a 0.025 inch square pin to the probe tip of the other lead and insert it into a pin on one of the connectors. Table 4–8 shows the voltage you should find on each pin of J102 or J8 and J103 or J9. Connector locations are shown in Figure 4–6 on page 4–21.

Measure the power supply voltages with the voltmeter and compare each reading to the values listed in the table. If the voltages are within about 5% of the nominal voltages, your power supply is functional.

**Table 4- 8: Power supply voltages**

| Power interconnect board (J102) Power distribution board (J8) | Voltage | Power interconnect board (J103) Power distribution board (J9) | Voltage |
|---|---|---|---|
| Pins 1, 2, 11 | +3.3 V | Pins 1, 2 | COM |
| Pin 12 | -12 V | Pins 3, 4 | +12 V |
| Pin 10 | +12 V | | |
| Pin 18 | -5 V* | | |
| Pins 4, 6, 19, 20 | +5 V | | |
| Pin 9 | +5 VSB | | |
| Pins 3, 5, 7, 13, 15, 16, 17 | COM | | |
| Pin 14 | PS-ON | | |
| Pin 8 | PW-OK | | |

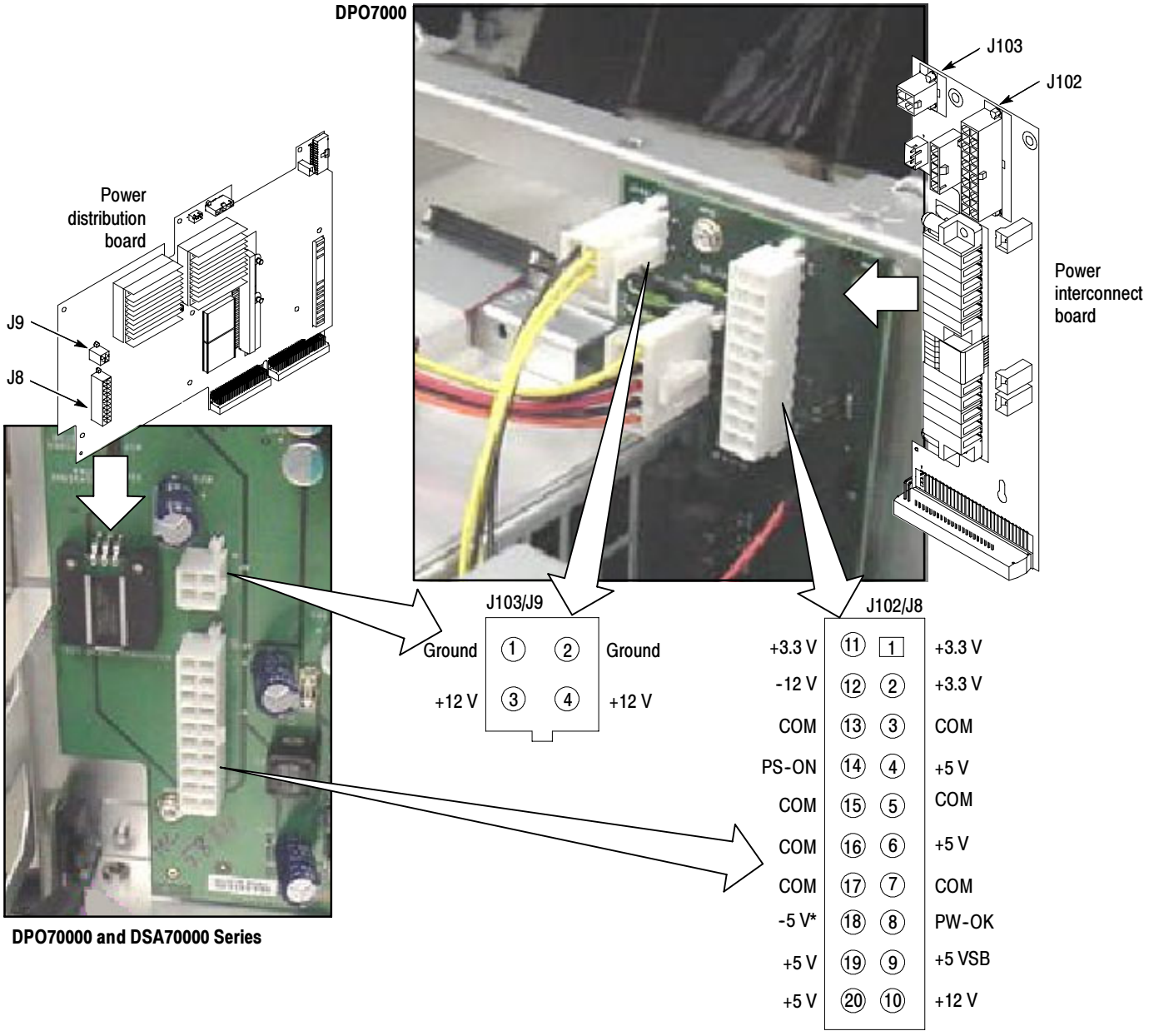



**Figure 4- 6: Power supply test points**

### If the Instrument Will Not Boot

If nothing is displayed, check that the display is turned on. At boot time, and while using an external monitor connected to the MicroATX external video port, press F2 to enter the BIOS setup. The Advanced Video Configuration menu lets you select PCI (LCD) or Integrated (the MicroATX VIDEO port on the rear panel). The lower XVGA port on the rear panel is the PCI video port (driven by the same video controller as the LCD).

If there is a display on the XVGA port, but not on the LCD, check the power supply voltages. If the voltages are okay but there is still no display on the LCD then replace the display assembly (LCD, lamps, and cable).

### Booting Into Windows

If the instrument will not boot, run the CMOS restore utility (see *Update/Restore the MicroATX Board CMOS* on page 4–31).

If booting starts, finds the hard disk, but hangs while displaying the Windows splash screen:

1. Select the Integrated video port using the setup menu.
2. Disable the busses and disconnect the PPC board by installing J111.
3. If the system boots (It will only boot to Windows, the instrument application will not run) to the external MicroATX video port, replace the Power Interface board.

### If the Instrument Application Does Not Work

If the instrument boots into Windows, but the instrument application does not work (the DPO Main graphic is displayed), check the following:

1. The application software.
2. The Acquisition board.
3. The Power Interface board (try removing and reinstalling the Power Interface board).
4. Did someone exit the application using Task Manager and then try to reenter the application without rebooting?
5. If the relays click, the acquisition is running.
6. On the Settings tab of the desktop properties, select Advanced and then the Performance tab. Hardware Acceleration must be set to Full for video merge to work. If you change the setting, reboot.

## Instrument Diagnostics

The primary diagnostics for the instrument are accessible through the Scope application software. Procedures for running these diagnostics are described next.

The Instrument diagnostics check the basic functionality of the acquisition system at every power on.

The Instrument Diagnostics run after Windows has booted up and run its own set of system checks. If any failures occur at power on a pop-up message indicates a failure has occurred and provides a choice to go directly to the diagnostic results window to view the specific failures, or to ignore them and continue directly into the scope application.

Table 4–9 lists all the available diagnostic tests and shows whether they run automatically at power-up, or are run manually.

The power on tests ensure that the hardware is installed and can be accessed by the software. The tests provide limited diagnostic information, and provide no performance information.

If there are no failures, you can view the results of the tests in the Instrument Diagnostics page, under the Utilities menu.

To run the instrument Diagnostics, do these steps:

1. Turn off all other applications.
2. From the menu bar, touch **Utilities** and then select **Instrument Diagnostics**; the Diagnostics control panel appears (see Figure 4–7).

**Figure 4-7: Diagnostics control panel**

**Table 4-9: Diagnostic tests**

| Component | Group & test | Error codes | Power on | Manual | Instrument |
|---|---|---|---|---|---|
| Processor | Memory | 111 DRAMWalk1<br>112 DRAMCell<br>113 DRAMMarch | ✓ | | All |
| Registers | PCI | 211 MIA | ✓ | | All |
| | Acquisition | 221 ACL<br>222 PCL<br>223 Preamp<br>224 TrkHld<br>225 ADC<br>226 DAC<br>227 Demux | ✓ | | All |
| | Trigger | 231 SBTL<br>232 SGTL<br>233 TrigComp<br>234 CommTrig | ✓ | | All |
| | Misc | 241 FanCtrl | ✓ | | All |

**Table 4-9: Diagnostic tests (Cont.)**

| Component | Group & test | Error codes | Power on | Manual | Instrument |
|---|---|---|---|---|---|
| Acquisition | Demux | 311 RunAB<br>312 AcqDone<br>313 SysRdy<br>314 Interrupt<br>315 IdcLoSpeed<br>316 IdcHiSpeed<br>317 IdcAcqDataXfr<br>318 IdcDispDataXfr | ✓ | | All |
| | DMA | 321 PaDMA<br>322 IdeAcqDMA | ✓ | | All |
| | Memory | 331 MemData<br>332 MemAddr<br>MemSpeed | ✓<br>✓ | <br><br>✓ | All |
| | Vertical | 341 Preamp Inputs<br>342 TH Inputs<br>343 ADC Inputs<br>344 ADC Outputs<br>345 50OhmOvld<br>346 LFComp | <br>✓<br><br><br>✓<br> | ✓<br><br>✓<br>✓<br><br>✓ | All |
| | PLL | 351 Clock Freq | ✓ | | All |
| | HFSource | 361 SINE<br>362 SINE33<br>363 SQUARE | | ✓ | DPO7000 only<br>All<br>All |
| | AcqProcessor | 371 SPI<br>372 INT Line<br>373 Interrupt<br>374 RelayDrive<br>375 TWI<br>376 PrbInterrupts<br>377 TCpowerCtrl<br>378 MAX517 | ✓ | | All<br>All<br>All<br>DPO/DSA70000 only<br>All<br>All<br>DPO/DSA70000 only<br>All |

**Table 4- 9: Diagnostic tests (Cont.)**

| Component | Group & test | Error codes | Power on | Manual | Instrument |
|---|---|---|---|---|---|
| Trigger | Inputs | 411 CH1 | ✓ | | All |
| | | 412 CH2 | | | All |
| | | 413 CH3 | | | All |
| | | 414 CH4 | | | All |
| | | 415 Line | | | All |
| | | 416 Video | | | DPO7000 only |
| | | 417 Events | | | All |
| | | 418 Serial | | | All |
| | Outputs | 421 523TrgOut | ✓ | | |
| | | 422 523CpuInt | ✓ | | DPO7000 only |
| | | 423 Fedge | ✓ | | DPO7000 only |
| | | 424 Ftrig | ✓ | | All |
| | | 425 TrigInfo | | ✓ | All |
| | Timers | 431 Delay | | ✓ | All |
| | | 432 Delta | | | |
| | | 433 Holdoff | | | |
| | | 434 PostTrig | | | |
| | | 435 PreTrig | | | |
| | | 436 Timeout | | | |
| TekLink | Topology | 511 Signals[1] | | ✓ | All |
| | Trigger | 521 Path[1] | | ✓ | All |
| | Reference | 531 Path[1] | | ✓ | All |

[1] **Requires external test fixture.**

## Software Updates

Software updates are easy to do. Simply install the firmware CD in your instrument and follow the displayed instructions or the instructions that accompany the CD.

If you want to order a software update, contact your Tektronix service center. See *Contacting Tektronix* on the back of the title page.

## After Repair

After removal and replacement of a module you must perform the Performance Verification procedure, found in the *DPO7000 Series Digital Phosphor Oscilloscopes Specifications and Performance Verification* manual, which was provided with the instrument. This manual is also available on the Tektronix Web site (www.tektronix.com).

If the instrument fails the Performance Verification tests, it must be returned to Tektronix for adjustment.

## µATX BIOS Error Messages

When the MicroATX board powers-on, the BIOS runs power-on-self-tests (POST) to check the board. The BIOS writes error codes to location 80h and tries to write the codes to the display. If the error is fatal, then the POST code indicates the last successful checkpoint reached. Table 4–10 lists the error messages displayed by the BIOS, and Table 4–11 lists the POST codes displayed by the BIOS.

Once the display is enabled, errors are written to the display as text messages. These messages are always displayed unless the board is configured for silent boot or headless (no keyboard, mouse, or display) operation.

**Table 4-10: µATX BIOS error messages**

| Error message | Description |
|---|---|
| GA20 Error | Error when switching to protected mode during the memory test. |
| Pri Master HDD Error, Pri Slave HDD Error<br>Sec Master HDD Error, Sec Slave HDD Error | Could not read sector. |
| Pri Master Drive - ATAPI Incompatible<br>PRI Slave Drive - ATAPI Incompatible<br>Sec Master Drive - ATAPI Incompatible<br>Sec Slave Drive - ATAPI Incompatible | Drive not an ATAPI device. Run Setup, and make sure device is set up correctly. |
| A: Drive Error | No response from drive. |
| Cache Memory Bad | Memory may be bad. |
| CMOS Battery Low | Replace battery. |
| CMOS Display Type Wrong | Check Setup to make sure type is correct. |
| CMOS Checksum Bad | Run Setup to reset values. |
| CMOS Settings Wrong | Settings corrupted or the battery has failed. |
| CMOS Date/Time Not Set | Run Setup to correct values. |
| DMA Error | Error during read/write test of controller. |
| FDC Failure | Error while trying to access controller. |
| HDC Failure | Error while trying to access controller. |
| Checking NVRAM. . . . | NVRAM is being checked. |
| Update OK! | Invalid NVRAM has been updated. |
| Updated Failed | Unable to update invalid NVRAM. |
| Keyboard Error | Make sure keyboard is connected properly. |
| KB/Interface Error | Keyboard test failed. |

**Table 4-10: μATX BIOS error messages (Cont.)**

| Error message | Description |
|---|---|
| Memory Size Decreased | If no memory was removed, the memory may be bad. |
| Memory Size Increased | If no memory was added, system may have a problem. |
| Memory Size Changed | If no memory was added or removed, the memory may be bad. |
| No Boot Device Available | Boot device not found. |
| Off Board Parity Error | Parity error occurred on an off-board card. |
| On Board Parity Error | Parity error occurred in on-board memory. |
| Parity Error | Error occurred in on-board memory at an unknown address. |
| NVRAM/CMOS/PASSWORD cleared by Jumper | Turn off power and remove the jumper. |
| <CTRL_N> Pressed | CMOS is ignored and NVRAM is cleared. Enter Setup. |

**Table 4-11: μATX POST codes**

| Module | Displayed POST code | Description |
|---|---|---|
| **Host Processor** | 10 | Power-on initialization of the host processor (Boot Strap Processor) |
| | 11 | Host processor Cache initialization (including APs) |
| | 12 | Starting Application processor initialization |
| | 13 | SMM initialization |
| **Chipset** | 21 | Initializing a chipset component |
| **Memory** | 22 | Reading SPD from memory DIMMs |
| | 23 | Detecting presence of memory DIMMs |
| | 24 | Programming timing parameters in the memory controller and the DIMMs |
| | 25 | Configuring memory |
| | 26 | Optimizing memory settings |
| | 27 | Initializing memory, such as ECC init |
| | 28 | Testing memory |
| **PCI Bus** | 50 | Enumerating PCI busses |
| | 51 | Allocating resources to PCI bus |
| | 52 | Hot Plug PCI controller initialization |
| | 53 - 57 | Reserved for PCI Bus |
| **USB** | 58 | Resetting USB bus |
| | 59 | Reserved for USB |

**Table 4-11: μATX POST codes (Cont.)**

| Module | Displayed POST code | Description |
|---|---|---|
| **ATA/ATAPI/SATA** | 5A | Resetting PATA/SATA bus and all devices |
| | 5B | Reserved for ATA |
| **SMBus** | 5C | Resetting SMBUS |
| | 5D | Reserved for SMBUS |
| **Local Console** | 70 | Resetting the VGA controller |
| | 71 | Disabling the VGA controller |
| | 72 | Enabling the VGA controller |
| **Remote Console** | 78 | Resetting the console controller |
| | 79 | Disabling the console controller |
| | 7A | Enabling the console controller |
| **Keyboard (PS2 or USB)** | 90 | Resetting keyboard |
| | 91 | Disabling keyboard |
| | 92 | Detecting presence of keyboard |
| | 93 | Enabling keyboard |
| | 94 | Clearing keyboard input buffer |
| | 95 | Instructing keyboard controller to run Self Test (PS2 only) |
| **Mouse (PS2 or USB)** | 98 | Resetting mouse |
| | 99 | Disabling mouse |
| | 9A | Detecting presence of mouse |
| | 9B | Enabling mouse |
| **Fixed Media** | B0 | Resetting fixed media |
| | B1 | Disabling fixed media |
| | B2 | Detecting presence of a fixed media (IDE hard drive detection etc.) |
| | B3 | Enabling/configuring a fixed media |
| **Removable media** | B8 | Resetting removable media |
| | B9 | Disabling removable media |
| | BA | Detecting presence of a removable media (IDE, CD-ROM detection, etc.) |
| | BC | Enabling/configuring a removable media |
| **BDS** | Dy | Trying boot selection y (y=0 to 15) |
| **PEI Core** | E0 | Started dispatching PEIMs (emitted on first report of EFI_SW_PC_INIT_BEGIN EFI_SW_PEI_PC_HANDOFF_TO_NEXT |
| | E2 | Permanent memory found |
| | E1, E3 | Reserved for PEI/PEIMs |

**Table 4-11: μATX POST codes (Cont.)**

| Module | Displayed POST code | Description |
|---|---|---|
| **DXE Core** | E4 | Entered DXE phase |
| | E5 | Started dispatching drivers |
| | E6 | Started connecting drivers |
| **DXE Drivers** | E7 | Waiting for user input |
| | E8 | Checking password |
| | E9 | Entering BIOS setup |
| | EA | TBD - Flash Update |
| | EB | Calling Legacy Option ROMs |
| | EE | TBD - Calling INT 19. One beep unless silent boot is enabled. |
| | EF | TBD - Unrecoverable Boot failure/S3 resume failure |
| **Runtime Phase/EFI OS Boot** | F4 | Entering Sleep state |
| | F5 | Exiting Sleep state |
| | F8 | EFI boot service ExitBootServices ( ) has been called |
| | F9 | EFI runtime service SetVirtualAddressMap ( ) has been called |
| | FA | EFI runtime service ResetSystem ( ) has been called |
| **PEIMs/Recovery** | 30 | Crisis Recovery has initiated per User request |
| | 31 | Crisis Recovery has initiated by software (corrupt flash) |
| | 34 | Loading recovery capsule |
| | 35 | Handing off control to the recovery capsule |
| | 3F | Unable to recover |

## BIOS Beep Codes

When the MicroATX board powers-on a number of the BIOS checkpoints generate an audible 'beep' code on failure using the standard PC speaker (also routed through the board audio system). The beep codes are listed in Table 4–12. Codes are also written to I/O port 80h and the video adapters. External ROM modules may issue a series of tones on error detection.

The BIOS generates one short beep if the power up self tests complete with out error.

If your instrument does not contain a speaker, attach a speaker to the display-adapter board square pins to hear the codes.

**Table 4-12: μATX beep codes**

| Beep code | Error message |
|---|---|
| 3 (long) | Memory error (beep freq = 1280 Hz) |
| 4 (alternating hi-low) | Thermal warning (beep freq - high = 2 kHz, low = 1.5 kHz) |
| 1 | Refresh failure |
| 2 | Cannot reset parity |
| 3 | Memory failure, first 64 KB |
| 4 | Timer failure |
| 5 | Not used |
| 6 | Cannot toggle 8042 GateA20 |
| 7 | Exception interrupt error |
| 8 | Display memory R/W error |
| 9 | Not used |
| 10 | CMOS Shutdown register test error |
| 11 | Cache memory error |

## Update/Restore the MicroATX Board CMOS

If the CMOS parameters become corrupted, restore the CMOS memory using one of the following procedures:

***CAUTION.*** I*nstall only CMOS parameters from Tektronix. CMOS parameters from other manufactures may make your instrument inoperable.*

If you cannot restore the CMOS memory, replace the battery.

Restore the CMOS as follows:

1. Press the **F2** key during reboot to enter the BIOS SETUP UTILITY.
2. In the BIOS SETUP UTILITY, press the **F9** key.
3. Press the **Enter** key to Load Optimal Defaults.
4. In the BIOS SETUP UTILITY, press the **F10** key.
5. Press the **Enter** key to Save configuration changes and exit.

## Installing an Authorization Key

If you add new options, you must install a new authorization key. Install the authorization key using the following procedure:

1. From the instrument menu bar, touch the **Utilities** menu, select **Option Installation**, and then touch **Continue**.
2. Enter the new key using an attached keyboard.
3. Touch **Continue**.

## Hard Disk Drive Maintenance

Use the same procedures to maintain the instrument hard disk drive that you use to maintain a hard disk drive in a personal computer.

Using ScanDisk, attempt to fix the disk without destroying data on the disk. To use ScanDisk, perform the following steps:

1. Remove the hard disk drive from the instrument.
2. Install the hard disk drive into a personal computer.
3. Power up the computer and run ScanDisk. Set Scandisk to perform a thorough surface scan and to automatically fix errors.
   - Using Microsoft Windows 2000: select My Computer\File\Properties\Tools\Error-checking
   - Using Microsoft MSDOS: enter SCANDISK *drive*: /SURFACE /AUTOFIX
4. If ScanDisk cannot repair the disk, format the hard disk drive using the File Utilities Format command. Format will destroy all data currently on the disk.
5. If reformatting the hard disk and reloading the software does not repair the disk, install a new hard disk drive.

# Returning the Instrument for Service

When repacking the instrument for shipment, use the original packaging. If the packaging is unavailable or unfit for use, contact your local Tektronix representative to obtain new packaging.

Seal the shipping carton with an industrial stapler or strapping tape.

Before returning the instrument for service, contact the Service Center to get an RMA (return material authorization) number, and any return or shipping information you may need.

If the instrument is being shipped to a Tektronix Service Center, enclose the following information:

- The RMA number.
- The owner's address.
- Name and phone number of a contact person.
- Type and serial number of the instrument.
- Reason for returning.
- A complete description of the required service.

Mark the address of the Tektronix Service Center and the return address on the shipping carton in two prominent locations.

# Replaceable Parts

# Replaceable Parts

This section contains a list of the replaceable module. Use this list to identify and order replacement parts.

## Parts Ordering Information

Replacement parts are available through your local Tektronix field office or representative.

Changes to Tektronix products are sometimes made to accommodate improved components as they become available and to give you the benefit of the latest improvements. Therefore, when ordering parts, it is important to include the following information in your order:

- Part number
- Instrument type or model number
- Instrument serial number
- Instrument modification number, if applicable

If you order a part that has been replaced with a different or improved part, your local Tektronix field office or representative will contact you concerning any change in part number.

### Module Servicing

Modules can be serviced by selecting one of the following three options. Contact your local Tektronix service center or representative for repair assistance.

**Module Exchange.** In some cases you may exchange your module for a remanufactured module. These modules cost significantly less than new modules and meet the same factory specifications. For more information about the module exchange program, call 1-800-833-9200. Outside North America, contact a Tektronix sales office or distributor; see the Tektronix Web site (www.tektronix.com) for a list of offices.

**Module Repair and Return.** You may ship your module to us for repair, after which we will return it to you.

**New Modules.** You may purchase replacement modules in the same way as other replacement parts.

# Using the Replaceable Parts List

This section contains a list of the replaceable mechanical and/or electrical components. Use this list to identify and order replacement parts. The following table describes each column in the parts list.

**Parts list column descriptions**

| Column | Column name | Description |
|---|---|---|
| 1 | Figure & index number | Items in this section are referenced by figure and index numbers to the exploded view illustrations that follow. |
| 2 | Tektronix part number | Use this part number when ordering replacement parts from Tektronix. |
| 3 and 4 | Serial number | Column three indicates the serial number at which the part was first effective. Column four indicates the serial number at which the part was discontinued. No entry indicates the part is good for all serial numbers. |
| 5 | Qty | This indicates the quantity of parts used. |
| 6 | Name & description | An item name is separated from the description by a colon (:). Because of space limitations, an item name may sometimes appear as incomplete. Use the U.S. Federal Catalog handbook H6-1 for further item name identification. |

**Abbreviations** Abbreviations conform to American National Standard ANSI Y1.1–1972.

## Replaceable parts list (<4.0 GHz models)

| Fig. & index number | Tektronix part number | Serial no. effective | Serial no. discont'd | Qty | Name & description |
|---|---|---|---|---|---|
| 5-1 | | | | | EXTERNAL PARTS |
| -1 | 016-1966-00 | | | 1 | POUCH; ACCESSORIES,BLACK,SNAP-ON |
| -2 | 200-4952-00 | | | 1 | COVER,TOP;COSMETIC |
| -3 | 211-1224-00 | | | 8 | SCREW,MACHINE; 6-32 X 0.312 L,PNH,STL CAD PLT,T15 |
| -4 | 200-4954-00 | | | 1 | COVER; EMI TOP, SAFETY CONTROLLED |
| -5 | 348-1861-00 | | | 4 | FOOT; REAR, ASSY. W/ CORD WRAP, THERMOPLASTIC,SRY |
| -6 | 174-5227-00 | | | 1 | CABLE ASSY;LINE FILTER; SAFETY CONTROLLED |
| -7 | 200-4957-00 | | | 1 | COVER,RIGHT;COSMETIC STINGRAY |
| -8 | 212-0232-00 | | | | SCREW,MACHINE:8-32 X 1.125L, PNH,STL,BLACK OXIDE,T-20 |
| -9 | 367-0528-00 | | | 1 | HANDLE,CARRYING; DUAL DUROMETER MOLDED,POLYPROPYLENE,VINYL GRIP SECTION,SAFETY CONTROLLED |
| | 407-4887-00 | | | 1 | BRACKET:HANDLE BASE,PC/ABS ALLOY,BAYER BAYBLEND FR-110,TEK BLUE, |
| -10 | 200-4955-00 | | | 1 | COVER; EMI BOTTOM, SAFETY CONTROLLED |
| -11 | 101-0172-00 | | | 1 | TRIM,ACQUISITION INSERT (VPI ONLY) |
| | 101-0173-00 | | | 1 | TRIM,ACQUISITION INSERT (HPI ONLY) |
| -12 | 200-4963-00 | | | 1 | COVER,FRONT; PC/ABS ALLOY BAYBLEND |
| -13 | 335-1757-00 | | | 1 | MARKER,IDENT; LABEL,IDENTIFICATION; (7354 ONLY) |
| | 335-1520-00 | | | 1 | MARKER,IDENT; LABEL,IDENTIFICATION; (7254 ONLY) |
| | 335-1551-00 | | | 1 | MARKER,IDENT; LABEL,IDENTIFICATION; (7104 ONLY) |
| | 335-1552-00 | | | 1 | MARKER,IDENT; LABEL,IDENTIFICATION; (7054 ONLY) |
| -14 | 101-0174-00 | | | 1 | TRIM,DVD |
| -15 | 101-0171-00 | | | 1 | TRIM RING; FR110,PC/ABS |
| -16 | 200-4958-00 | | | 1 | COVER,LEFT;COSMETIC STINGRAY |
| -17 | 355-0303-00 | | | 4 | STUD.SNAP:0.570 DIA,0.165 THK,STAINLESS STEEL |
| -18 | 211-0721-00 | | | 4 | SCREW,MACHINE; 6-32 X 0.375,PNH,STL,CDPL,T-15 TORX DR |
| -19 | 335-1517-00 | | | 1 | LABEL,REAR,LEXAN,MOTHERBOARD TAPPEN, SAFETY CONTROLLED |

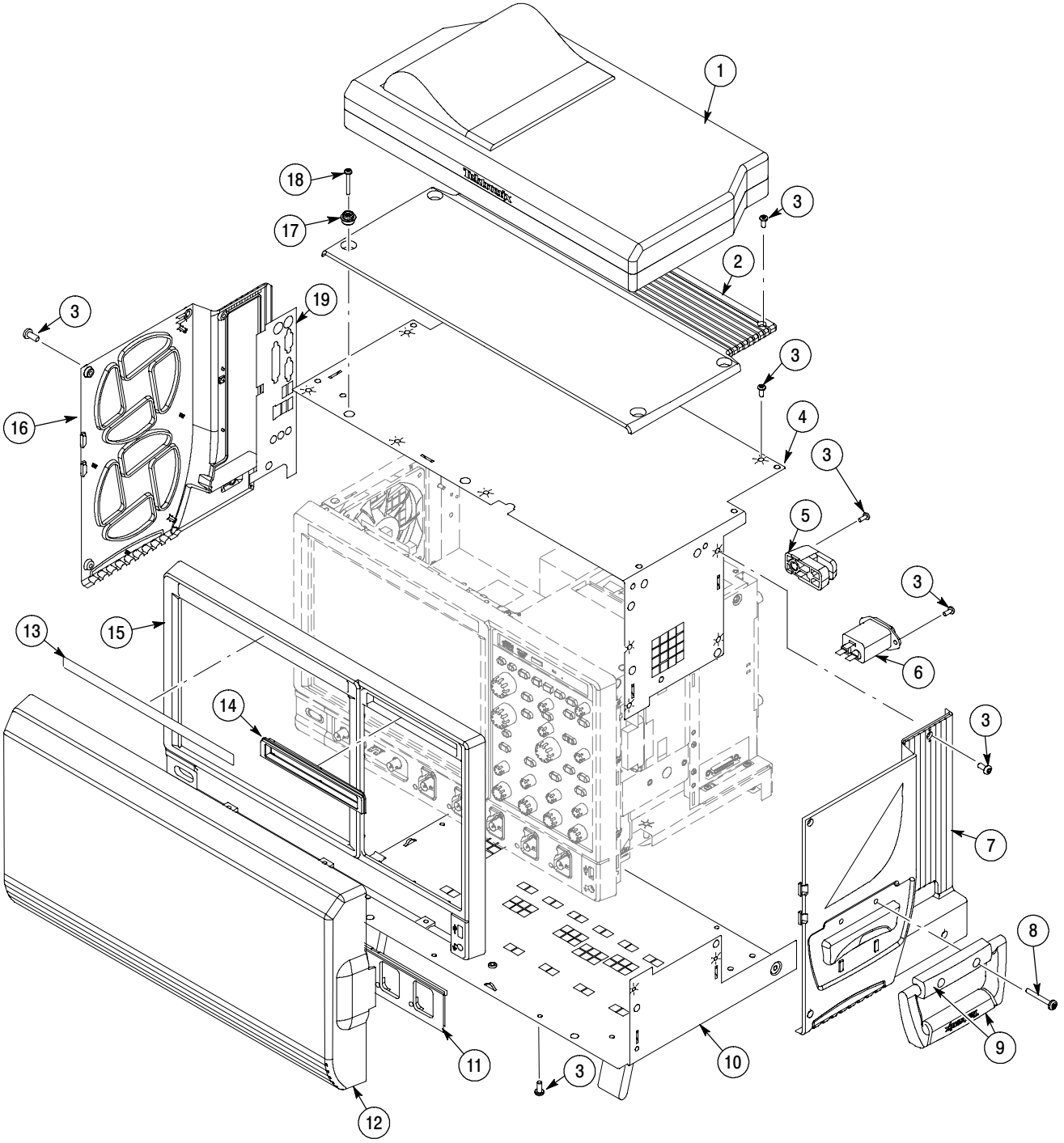



**Figure 5- 1: External parts (<4.0 GHz models)**

## Replaceable parts list (<4.0 GHz models)

| Fig. & index number | Tektronix part number | Serial no. effective | Serial no. discont'd | Qty | Name & description |
|---|---|---|---|---|---|
| **5-2** | | | | | **FRONT PANEL AND DISPLAY** |
| -1 | 174-5165-00 | | | 1 | CABLE ASSY;POWER SWITCH |
| -2 | 211-1221-00 | | | 2 | SCREW;M2.0 6-MM LONG PHILLIPS FLATHEAD ZINC-PLATED |
| -3 | 671-6107-00 | | | 1 | CIRCUIT BOARD ASSY; USB |
| -4 | 211-1050-00 | | | 4 | SCREW,MACHINE; 6-32 X 0.312 L,PNH,STL CAD PLT,T15 |
| -5 | 174-5164-00 | | | 1 | CA ASSY;USB 2.0 |
| -6 | 065-0756-01 | | | 1 | MODULAR ASSY, FRONT PANEL,TERMINATOR |
| -7 | 407-5140-00 | | | 1 | BRACKET;TRIM,FRONT PANEL,SHEET METAL, SAFETY CONTROLLED |
| -8 | 065-0760-01 | | | 1 | CIRCUIT BD ASSY;FRONT PANEL;TERMINATOR |
| -9 | 671-6062-00 | | | 1 | CIRCUIT BD ASSY;FRONT PANEL ENCODER;TERMINATOR |
| -10 | 366-0859-01 | | | 1 | ASSEMBLY, KNOB; .470 DIAMETER, SOFT TOUCH |
| -11 | 366-0860-01 | | | 1 | ASSEMBLY, KNOB; .685 DIAMETER, SOFT TOUCH |
| -12 | 366-0861-01 | | | 1 | ASSEMBLY, KNOB; .925 DIAMETER, SOFT TOUCH |
| -13 | 174-5162-00 | | | 1 | CABLE ASSY; DISPLAY ADAPTER TO FRONT PANEL BOARD |
| -14 | 211-0747-00 | | | 8 | SCREW,MACHINE; 6-32 X 0.188,PNH,STL,CDPL,T-15 TORX DR |
| -15 | 211-0721-00 | | | 4 | SCREW,MACHINE; 6-32 X 0.375,PNH,STL,CDPL,T-15 TORX DR |
| -16 | 065-0742-00 | | | 1 | MODULE ASSY;SERVICE REPLACEMENT,TOUCH PANEL W/ PACKAGING |
| -17 | 065-0766-01 | | | 1 | MODULE ASSY;SERVICE REPLACEMENT,LCD,INTERCONNECT DISPLAY ADAPTER BOARD W/ PACKAGING |
| -18 | 174-5160-00 | | | 1 | CABLE ASSY;DISPLAY ADAPTER TO DISPLAY |
| -19 | 065-0746-01 | | | 1 | POWER BUTTON ASSEMBLY |

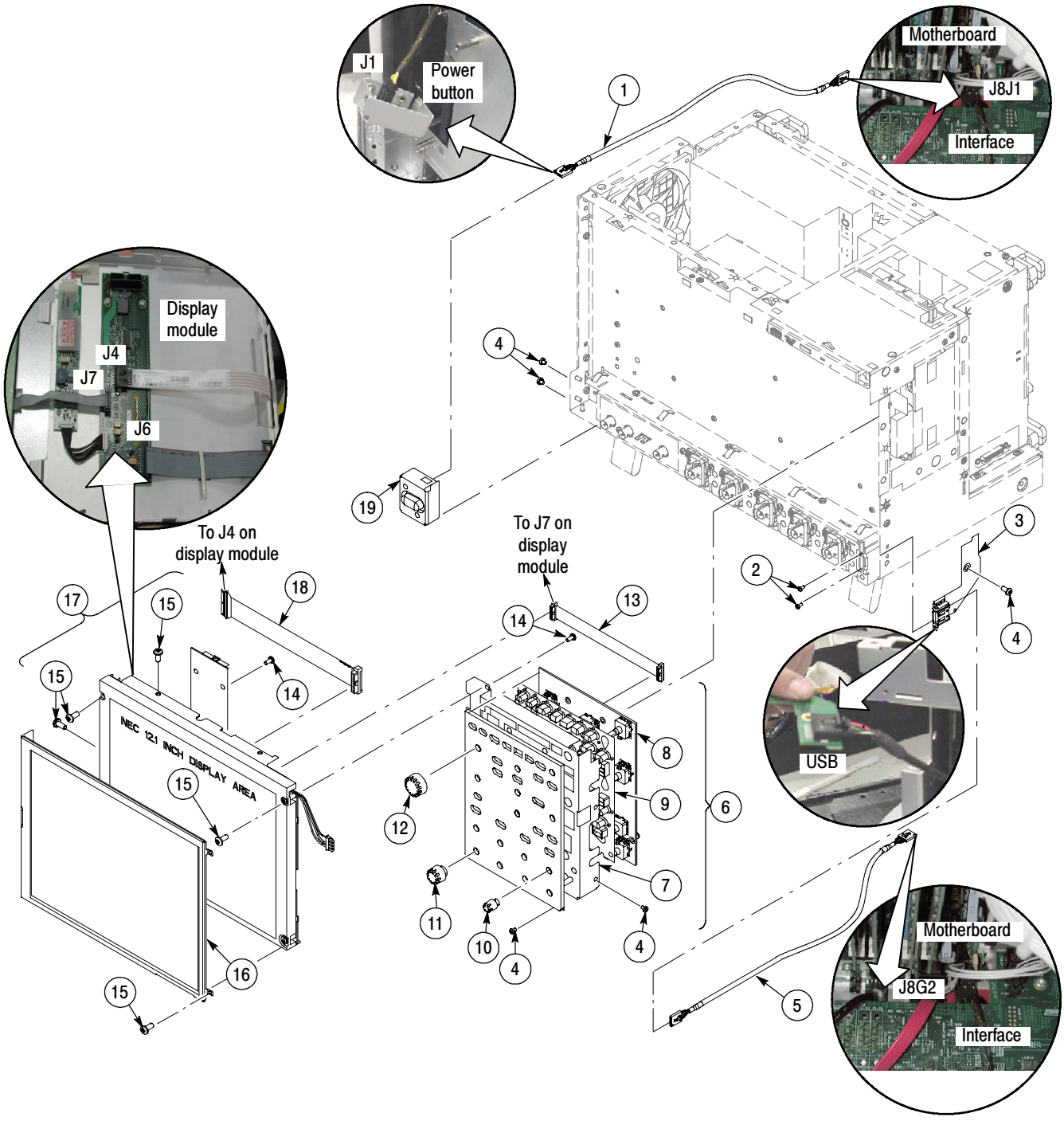



**Figure 5-2: Front panel and display (<4.0 GHz models)**

## Replaceable parts list (<4.0 GHz models)

| Fig. & index number | Tektronix part number | Serial no. effective | Serial no. discont'd | Qty | Name & description |
|---|---|---|---|---|---|
| **5-3** | | | | | **POWER SUPPLY AND FANS** |
| -1 | 119-6986-00 | | | 1 | POWER SUPPLY; AC-DC;460W;+3.3V 40A,+5V 34A,+12V 25A,-12V 1A,+5VSB 2A;90-264VAC,47-63HZ;BERG 51624-XX001;9.5X4.9X3.8IN,SAFETY CONTROLLED |
| -2 | 407-5089-00 | | | 1 | BRACKET;LVPS, SAFETY CONTROLLED |
| -3 | 211-1050-00 | | | 9 | SCREW,MACHINE; 6-32 X 0.312 L,PNH,STL CAD PLT,T15 |
| -4 | 436-0421-00 | | | 1 | TRAY,FAN; CHASSIS ASSY,W/FANS MOUNTED;STINGRAY,SAFETY CONTROLLED |
| -5 | 441-2435-00 | | | 1 | CHASSIS;MAIN;AL, SAFETY CONTROLLED |
| -6 | 671-5930-00 | | | 1 | CIRCUIT BD SUBASSY;POWER INTERCONNECT; 389-3659-00;WIRED;SAFETY CONTROLLED |
| -7 | 343-1584-00 | | | 4 | CLAMP; WIRE ROUTING,0.51 H X 0.625W,NYLON |
| -8 | 335-1515-00 | | | 1 | LABEL,CHASSIS,REAR, SAFETY CONTROLLED |

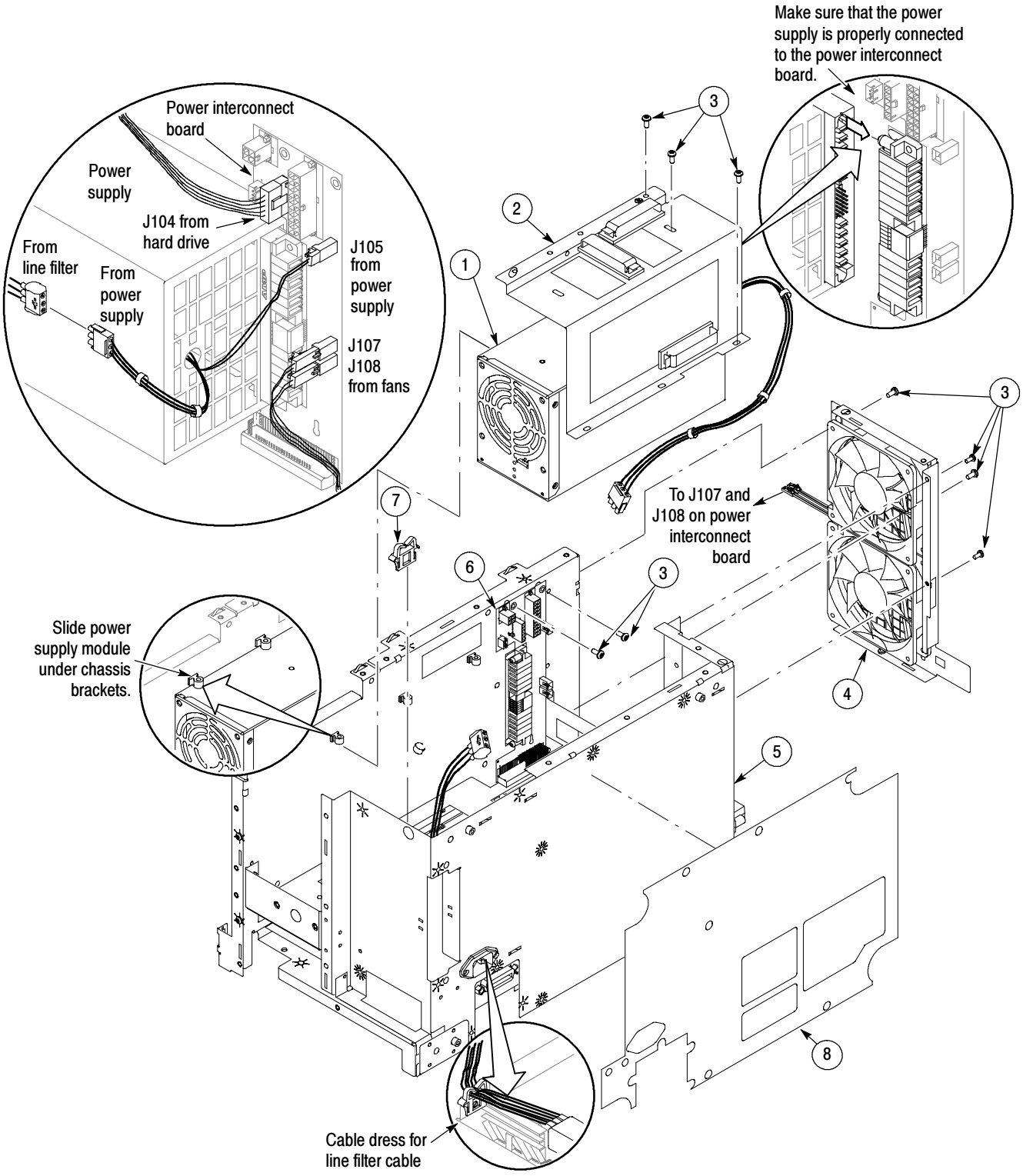



**Figure 5- 3: Power supply and fans (<4.0 GHz models)**

## Replaceable parts list (<4.0 GHz models)

| Fig. & index number | Tektronix part number | Serial no. effective | Serial no. discont'd | Qty | Name & description |
|---|---|---|---|---|---|
| **5-4** | | | | | **MOTHERBOARD** |
| -1 | 065-0745-02 | | | 1 | SERVICE KIT FOR COMPUTER BOARD; CPU, FAN AND HEATSINK |
| | 167-0657-00 | | | 1 | PROCESSOR;PENTIUM 4, 3.4 GHZ INTERNAL CLOCK,400MHZ BUS,SOCKET 478 COMPATIBLE,W/O FAN HEATSINK,JM80547PG0961M |
| -2 | 119-7333-00 | | | 1 | FAN AND HEAT SINK WITH BRACKET |
| -3 | 119-7333-00 | | | 1 | BRACKET WITH FAN AND HEATSINK |
| -4 | 167-0428-00 | B010100 | B010856 | 4 | IC,MEMORY;64M X 64,512 MB DDR2,1.8V, 3-3-3;MT16HTF6464AY-40E,DIMM240,DS1 |
| | 167-0429-00 | B010857 | | 2 | IC,MEMORY;128M X 64,1 GB DDR2,1.8V, 3-3-3;MT16HTF12864AY-40E,DIMM240,DS1 |
| -5 | 174-5271-00 | | | 1 | IDE CABLE WITH STRAIN RELIEF & PULL-TAB |
| -6 | 211-1050-00 | | | 5 | SCREW,MACHINE; 6-32 X 0.312 L,PNH,STL CAD PLT,T15 |
| -7 | 174-4797-00 | | | 1 | CA ASSY; 20 PIN ATX POWER,SAFETY CONTROLLED |
| -8 | 174-4865-00 | | | 1 | CA ASSY; 4 PIN P4 POWER,9.5 L,MOTHER BOARD TO INTERFACE BOARD,SAFETY CONTROLLED |
| -9 | 441-2466-01 | | | 1 | CHASSIS; REAR PROCESSOR |

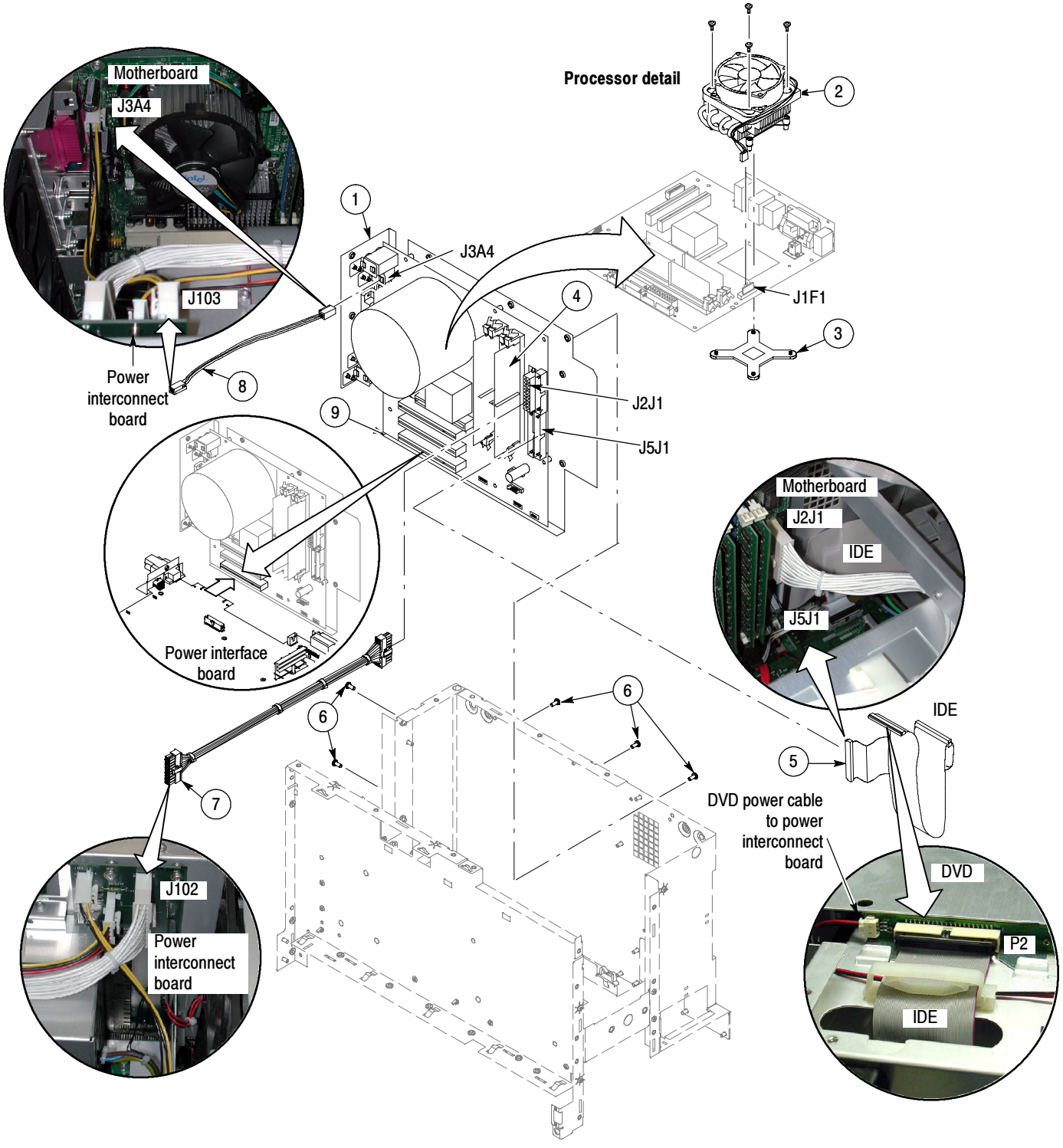



**Figure 5- 4: µATX Motherboard (<4.0 GHz models)**

## Replaceable parts list (<4.0 GHz models)

| Fig. & index number | Tektronix part number | Serial no. effective | Serial no. discont'd | Qty | Name & description |
|---|---|---|---|---|---|
| **5-5** | | | | | **POWER INTERFACE AND ACQUISITION ASSEMBLIES** |
| -1 | 211-1050-00 | | | 19 | SCREW,MACHINE; 6-32 X 0.312 L,PNH,STL CAD PLT,T15 |
| -2 | 174-5048-00 | | | 1 | CA ASSY;USB 1.0 |
| -3 | 174-5159-00 | | | 1 | CABLE ASSY;GPIB |
| -4 | 335-1518-00 | | | 1 | LABEL,TEKLINK, SAFETY CONTROLLED |
| -5 | 211-1206-00 | | | 2 | SCREW,JACK; 2-56 ID X 4-40 OD,.188 HEX,SS |
| -6 | 671-5912-02 | | | 1 | CIRCUIT BD ASSY;POWER INTERFACE,6795912XX,TESTED;WIRED, 389352600 |
| -7 | 213-1061-00 | | | 2 | JACKSCREW; 6-32 X 0.320 EXT THD,M3.5 X 0.6-6 INT THD X 0.215L,GPIB,BLACK OXIDE,BULK PACK |
| -8 | 211-0747-00 | | | 3 | SCREW,MACHINE; 6-32 X 0.188,PNH,STL,CDPL,T-15 TORX DR |
| -9 | 672-5819-54 | | | 1 | CIRCUIT BD ASSY;ACQ,6725819XX,TESTED;WIRED, (DPO7254 ONLY) |
| | 672-6166-54 | | | | CIRCUIT BD ASSY;ACQ,6726166XX,TESTED;WIRED, (DPO7104, DPO7054 ONLY) |
| | 672-6172-50 | | | | CIRCUIT BD ASSY;ACQ,6726172XX,TESTED;WIRED, (DPO7354 ONLY) |
| -10 | 441-2436-00 | | | 1 | CHASSIS; ACQ;AL, SAFETY CONTROLLED |
| -11 | 174-5161-00 | | | 1 | CABLE ASSY; DISPLAY ADAPTER TO PCI BOARD |

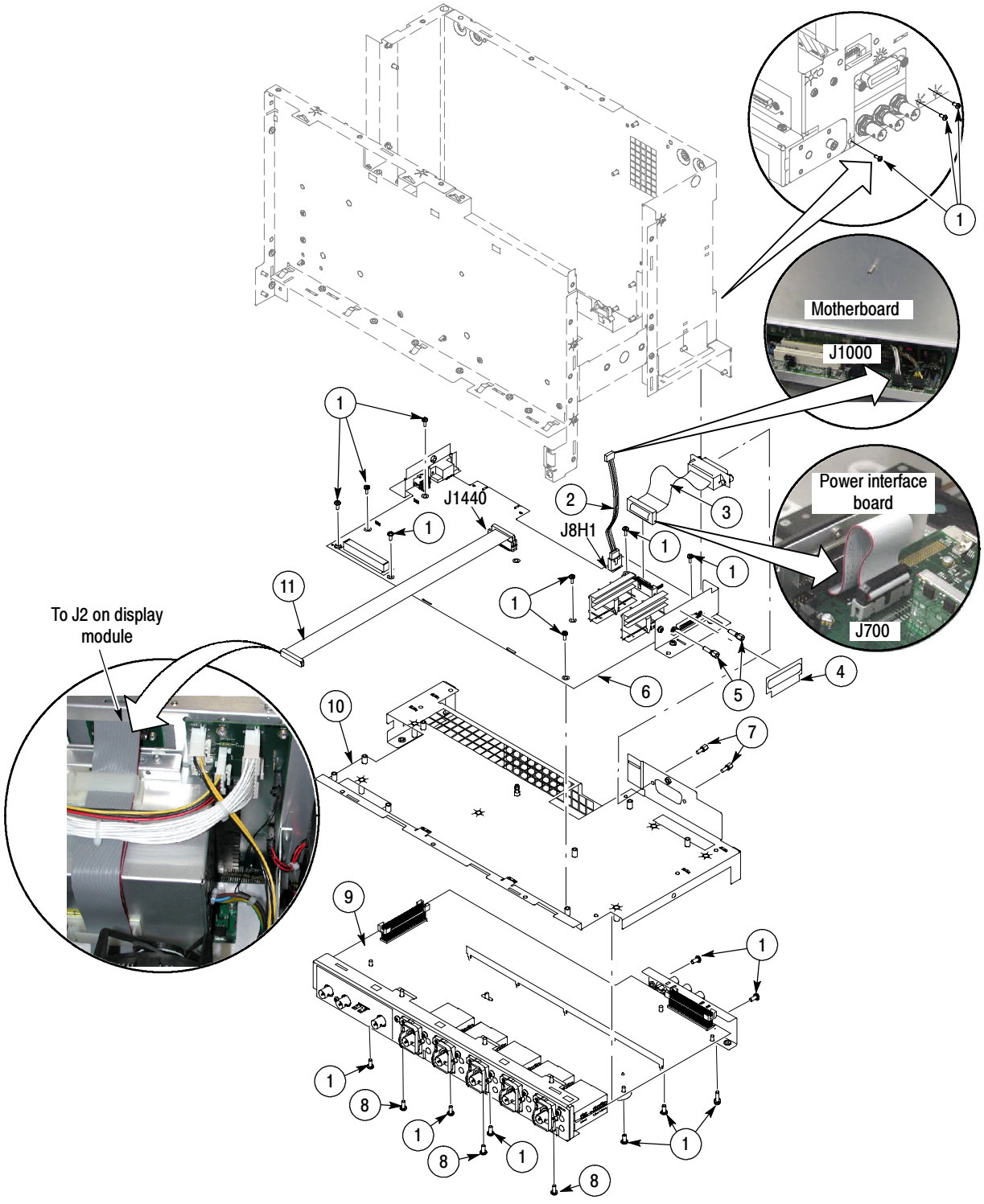



**Figure 5- 5: Power interface and Acquisition assemblies (<4.0 GHz models)**

## Replaceable parts list (<4.0 GHz models)

| Fig. & index number | Tektronix part number | Serial no. effective | Serial no. discont'd | Qty | Name & description |
|---|---|---|---|---|---|
| **5-6** | | | | | **DRIVES** |
| -1 | 065-0744-00 | | | 1 | DISK DRIVE ASSY;SERVICE REPLACEMENT W/O SOFTWARE, W/ PACKAGING |
| -2 | 211-1050-00 | | | 11 | SCREW,MACHINE; 6-32 X 0.312 L,PNH,STL CAD PLT,T15 |
| -3 | 407-5069-00 | | | 1 | BRACKET,RHDD; SATA COMBO CABLE,3.5 INCH REMOVABLE HARD DISK DRIVE RECEPTACLE |
| -4 | 174-5169-00 | | | 1 | CABLE ASSY; SATA COMBO,HARD DRIVE CABLE |
| -5 | 679-5915-00 | | | 1 | CKT BD SUBASSY; DVD-CD/RW ADAPTER,UNTESTED,389-3689-00 WIRED |
| -6 | 129-1618-00 | | | 1 | SPACER; DVD-CD/RW SLIMLINE DRIVE ADAPTER,PLASTIC |
| -7 | 065-0666-02 | | | 1 | DISK DRIVE;OPTICAL,644MB,CD-RW/DVD ROM,COMBO,16.7 MB/SEC,IDE/ATA-PI;DW-224E-C93, SAFETY CONTROLLED |
| -8 | 211-0950-00 | | | 3 | SCREW,MACHINE; M2X.4X3L,PHL, PNH, STL NI PL |
| -9 | 407-5156-00 | | | 1 | BRACKET,DVD-CD/RW,COMBO;ADAPTER FOR DVD-CD/RW,COMBO,SLIMLINE |
| -10 | 174-5017-00 | | | 1 | CABLE ASSEMBLY; DVD POWER |

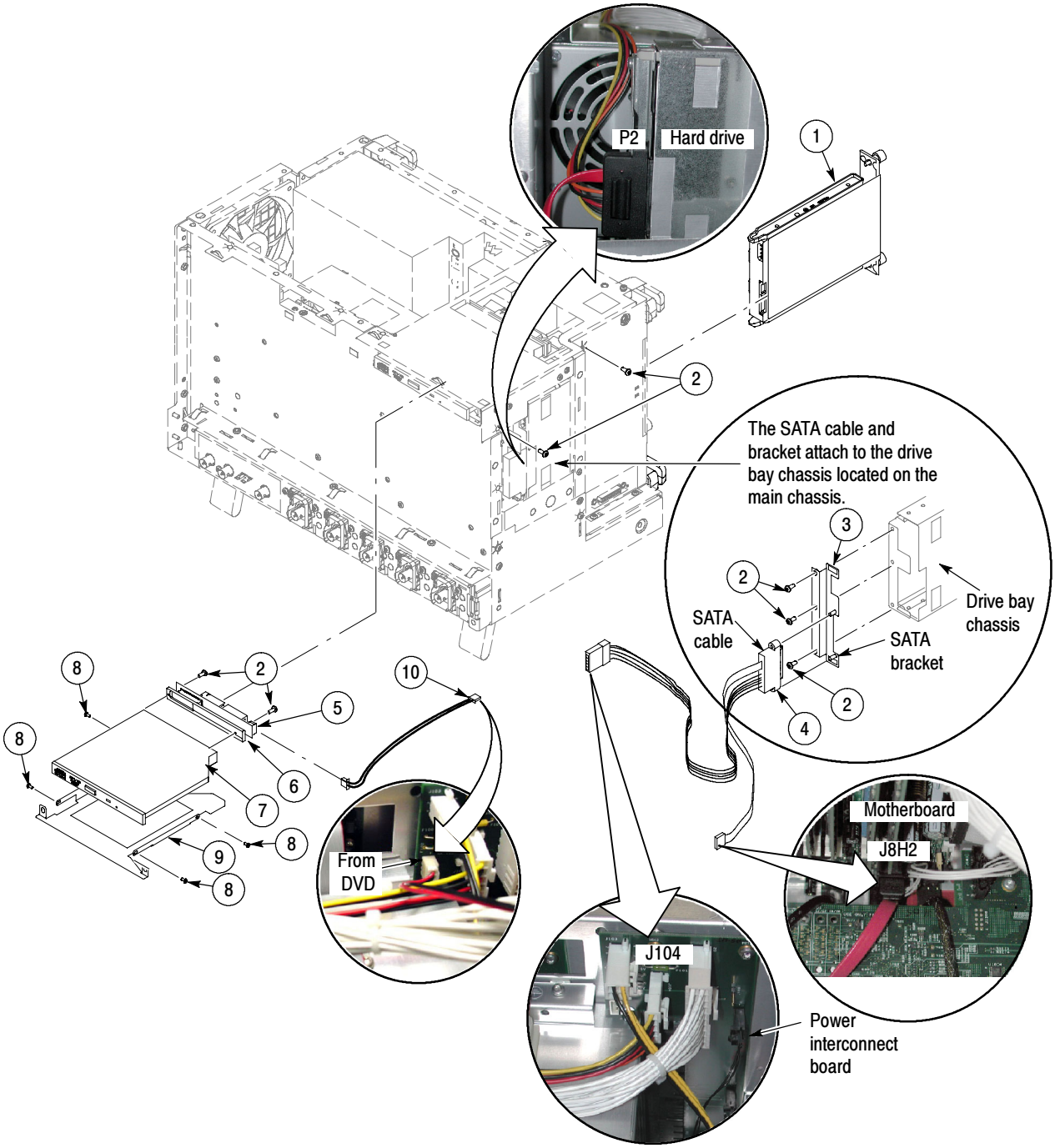



**Figure 5- 6: Drives (<4.0 GHz models)**

## Replaceable parts list (<4.0 GHz models)

| Fig. & index number | Tektronix part number | Serial no. effective | Serial no. discont'd | Qty | Name & description |
|---|---|---|---|---|---|
| | | | | | **Standard Accessories** |
| | See Description | | | 1 | CABLE ASSY, POWER:<br>OPTION COUNTRY P/N<br>A0 N. AMERICA 061-0066-00<br>A1 UNIV EURO 161-0104-06<br>A2 UK 161-0104-07<br>A3 AUSTRALIA 161-0104-05<br>A5 SWITZERLAND 161-0167-00<br>A10 CHINA 161-0306-00<br>A11 INDIA 161-0324-00 |
| | See Description | | | 1 | QUICK START USER MANUAL<br>OPTION LANG P/N<br>L0 ENGLISH 071-1733-XX<br>L1 FRENCH 071-1734-XX<br>L3 GERMAN 071-1735-XX<br>L5 JAPANESE 071-1736-XX<br>L7 CHINESE, S 071-1738-XX<br>L8 CHINESE, T 071-1743-XX<br>L9 KOREAN 071-1737-XX<br>L10 RUSSIAN 071-1739-XX |
| | 119-7054-00 | | | 1 | POINTER ASSY; MOUSE, MICROSOFT BLACK OPTICAL WHEELED, USB AND PS2 |
| | 020-2659-00 | | | 1 | OS RESTORE CD AND INSTRUCTIONS |
| | 020-2693-00 | | | 1 | PRODUCT SW CD AND INSTRUCTIONS |
| | 067-0405-00 | | | 1 | PROBE CALIBRATION AND DESKEW FIXTURE |
| | P6139A | | | 4 | P6139A 500 MHZ, 10X PASSIVE PROBES<br>(DPO7054 ONLY) |

## Replaceable parts list ( ≥ 4.0 GHz models)

| Fig. & index number | Tektronix part number | Serial no. effective | Serial no. discont'd | Qty | Name & description |
|---|---|---|---|---|---|
| 7-1 | 016-1441-01 | | | 1 | ACCESSORY POUCH; BLACK CORDURA |
| -2 | 200-5029-00 | | | 1 | COVER,TOP;COSMETIC |
| -3 | 211-1224-00 | | | 8 | SCREW,MACHINE; 6-32 X 0.375,PNH,STL,CDPL,T-15 |
| -4 | 355-0298-00 | | | 1 | STUD.SNAP; 0.570 DIA,0.165 THK,STAINLESS STEEL |
| -5 | 200-4937-00 | | | 1 | COVER; EMI TOP |
| -6 | 211-1050-00 | | | 14 | SCREW,MACHINE; 6-32 X 0.312 L,PNH,STL CAD PLT,T15 |
| -7 | 348-1859-00 | | | 4 | FOOT; REAR, W/ CORD WRAP, THERMOPLASTIC |
| -8 | 101-0173-01 | | | 1 | TRIM,ACQUISITION INSERT |
| -9 | 101-0171-00 | | | 1 | TRIM RING; FR110,PC/ABS |
| -10 | 200-4963-00 | | | 1 | COVER,FRONT;PC/ABS ALLOY BAYBLEND |
| -11 | 101-0174-00 | | | 1 | TRIM,DVD |
| -12 | 335-1628-00 | | | 1 | MARKER, IDENT; DPO70404 |
| | 335-1629-00 | | | | MARKER, IDENT; DPO70604 |
| | 335-1630-00 | | | | MARKER, IDENT; DPO70804 |
| | 335-1680-00 | | | | MARKER, IDENT; DPO71254 |
| | 335-1681-00 | | | | MARKER, IDENT; DPO71604 |
| | 335-1682-00 | | | | MARKER, IDENT; DPO72004 |
| | 335-1631-00 | | | | MARKER, IDENT; DSA70404 |
| | 335-1632-00 | | | | MARKER, IDENT; DSA70604 |
| | 335-1633-00 | | | | MARKER, IDENT; DSA70804 |
| | 335-1683-00 | | | | MARKER, IDENT; DSA71254 |
| | 335-1684-00 | | | | MARKER, IDENT; DSA71604 |
| | 335-1685-00 | | | | MARKER, IDENT; DSA72004 |
| -13 | 348-1817-00 | | | 2 | FOOT, SKID |

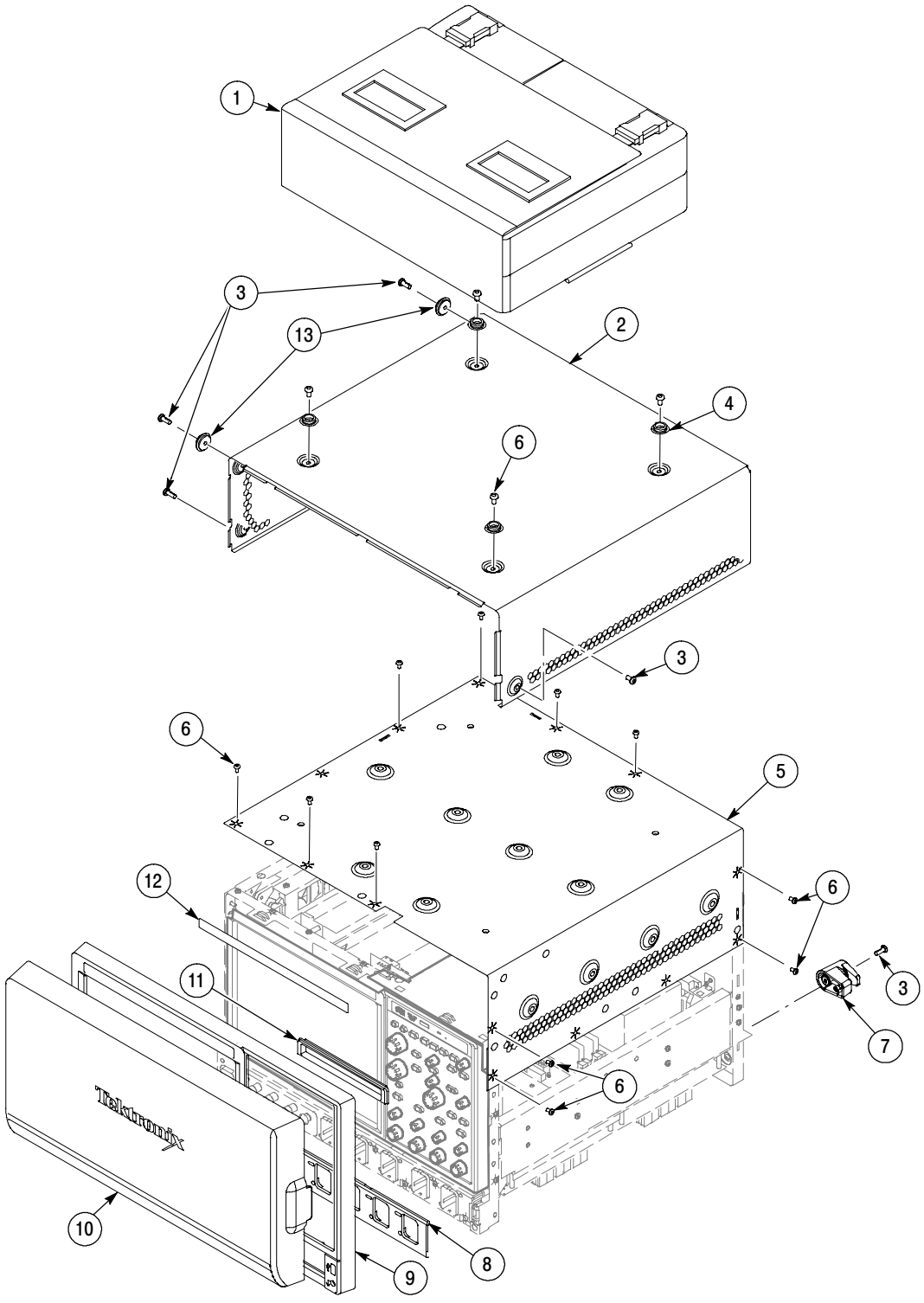



**Figure 5- 7: External parts 1 ( ≥ 4.0 GHz models)**

## Replaceable parts list ( ≥ 4.0 GHz GHz models)

| Fig. & index number | Tektronix part number | Serial no. effective | Serial no. discont'd | Qty | Name & description |
|---|---|---|---|---|---|
| 8-1 | 174-5226-00 | | | 1 | CABLE ASSY;LINE FILTER |
| -2 | 211-1050-00 | | | 16 | SCREW,MACHINE; 6-32 X 0.312 L,PNH,STL CAD PLT,T15 |
| -3 | 200-4936-00 | | | 1 | COVER; EMI BOTTOM,DPO/DSA70804/70604/70404 |
| | 200-5007-00 | | | 1 | COVER; EMI BOTTOM,DPO/DSA720004/71604/71254 |
| -4 | 200-5030-00 | | | 1 | COVER,BOTTOM;COSMETIC;W/FEET |
| -5 | 212-0232-00 | | | 2 | SCREW,MACHINE; 8-32 X 1.125L,PNH,STL,BLACK ZINC SPEC #ASTM B633 TYPE II,T-20 |
| -6 | 367-0528-00 | | | 1 | HANDLE,CARRYING; DUAL DUROMETER MOLDED,POLYPROPYLENE,VINYL GRIP SECTION |
| | 407-4887-00 | | | 1 | BRACKET; HANDLE BASE,PC/ABS ALLOY,BAYER BAYBLEND FR-110,TEK BLUE |
| -7 | 348-1515-00 | | | 1 | FEET,CABINET; BLACK,GLASS-FIBRE REINFORCED PLASTIC,SET OF 4 FEET, 4 RUBBER INSERTS |
| -8 | 211-1224-00 | | | 4 | SCREW,MACHINE,BLACK |
| -9 | 348-1817-00 | | | 2 | FOOT, SKID |

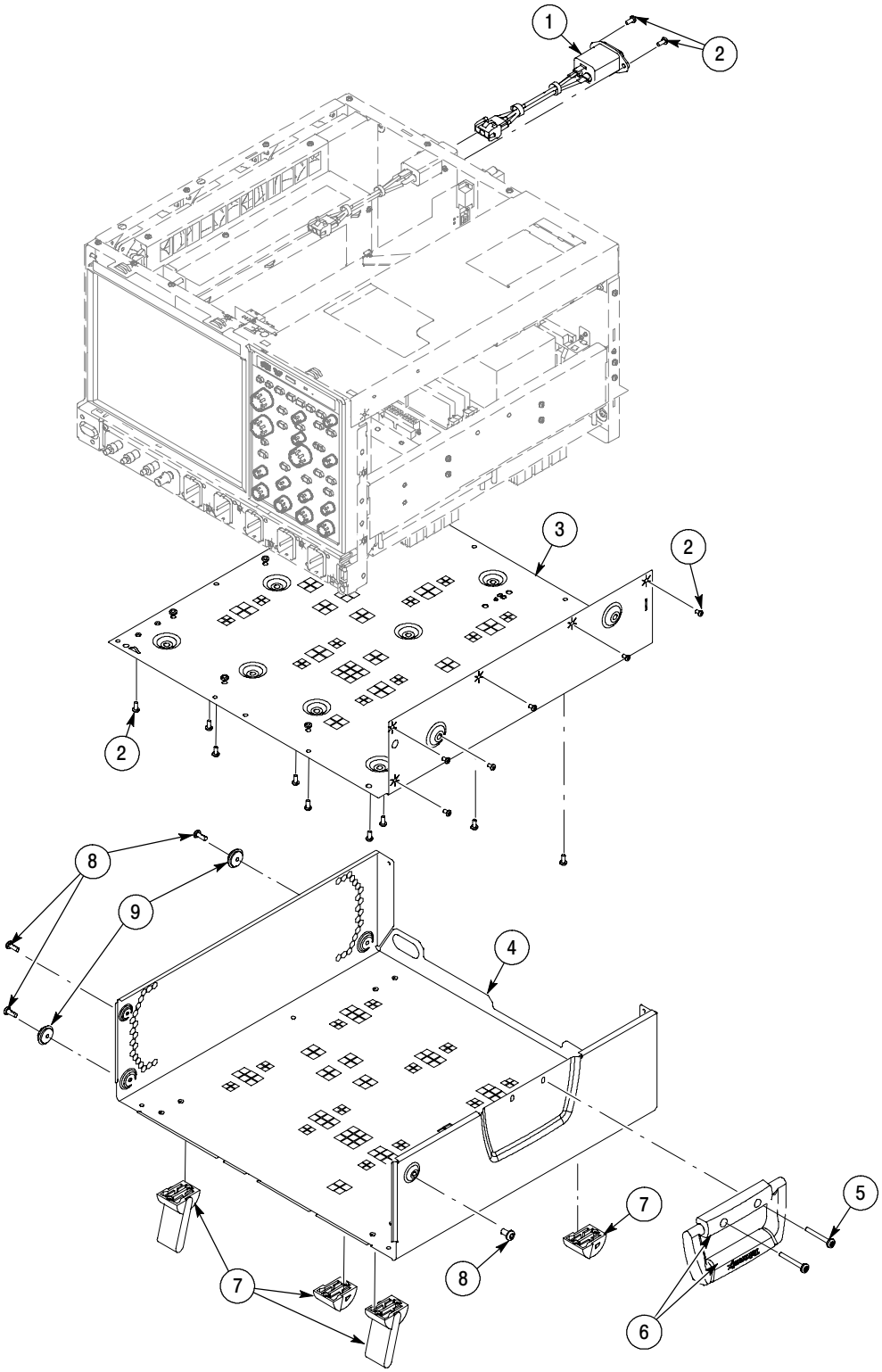



**Figure 5- 8: External parts 2 ( ≥ 4.0 GHz models)**

## Replaceable parts list ( ≥ 4.0 GHz models)

| Fig. & index number | Tektronix part number | Serial no. effective | Serial no. discont'd | Qty | Name & description |
|---|---|---|---|---|---|
| 9-1 | 174-5165-00 | | | 1 | CABLE ASSY;POWER SWITCH |
| -2 | 065-0756-00 | | | 1 | MODULAR ASSY, FRONT PANEL,TERMINATOR |
| -3 | 671-6062-00 | | | 1 | CIRCUIT BOARD ASSY;FRONT PANEL ENCODER |
| -4 | 065-0760-00 | | | 1 | CIRCUIT BD ASSY;FRONT PANEL MAIN |
| -5 | 260-2818-00 | | | 1 | SWITCH,KEYPAD; ELASTOMER EMAT |
| -6 | 211-1150-00 | | | 1 | SCREW,MACHINE; 6-32 X 0.172,PNH,STL,T-15 TORX DR,BLACK OXIDE |
| -7 | 407-5140-00 | | | 1 | BRACKET;TRIM,FRONT PANEL,SHEET METAL |
| -8 | 333-4522-00 | | | 1 | PANEL ASSEMBLY; FRONT SUBPANEL,W/BRACKET ASSEMBLY,BEZEL & LABEL |
| -9 | 366-0859-01 | | | 1 | ASSEMBLY, KNOB; .470 DIAMETER, SOFT TOUCH |
| -10 | 366-0860-01 | | | 1 | ASSEMBLY, KNOB; .685 DIAMETER, SOFT TOUCH |
| -11 | 366-0861-01 | | | 1 | ASSEMBLY, KNOB; .925 DIAMETER, SOFT TOUCH |
| -12 | 174-5162-00 | | | 1 | CABLE ASSY; DISPLAY ADAPTER TO FRONT PANEL BOARD |
| -13 | 211-0747-00 | | | 4 | SCREW,MACHINE; 6-32 X 0.188,PNH,STL,CDPL,T-15 |
| -14 | 065-0742-00 | | | 1 | TOUCH SCREEN ASSEMBLY, 12.1 IN, RESISTIVE, 5-WIRE, W/GASKETS,W/BRACKETS |
| -15 | 211-0721-00 | | | 5 | SCREW,MACHINE; 6-32 X 0.375,PNH,STL,CDPL,T-15 |
| -16 | 065-0743-00 | B010100 | B01xxxx | 1 | COMPONENT KIT; LCD DISPLAY ADAPTER MODULE SUBASSEMBLY,STANDARD |
| | 065-0766-00 | B01xxxx | | 1 | COMPONENT KIT; LCD DISPLAY ADAPTER MODULE SUBASSEMBLY,STANDARD |
| -17 | 174-5160-00 | | | 1 | CABLE ASSY;DISPLAY ADAPTER TO DISPLAY |
| -18 | 174-5163-00 | | | 1 | CABLE ASSY;DISPLAY ADAPTER TO INVERTER BOARD |
| -19 | 065-0746-01 | | | 1 | MODULE ASSY;SERVICE REPLACEMENT KIT,POWER BUTTON ASSY |
| -20 | 679-6077-00 | B010100 | B01xxxx | 1 | CIRCUIT BOARD ASSY;DISPLAY ADAPTER |
| | 679-6283-01 | B01xxxx | | 1 | CIRCUIT BOARD ASSY;DISPLAY ADAPTER |
| -21 | 119-7016-00 | | | 1 | CIRCUIT BOARD ASSY;INVERTER |

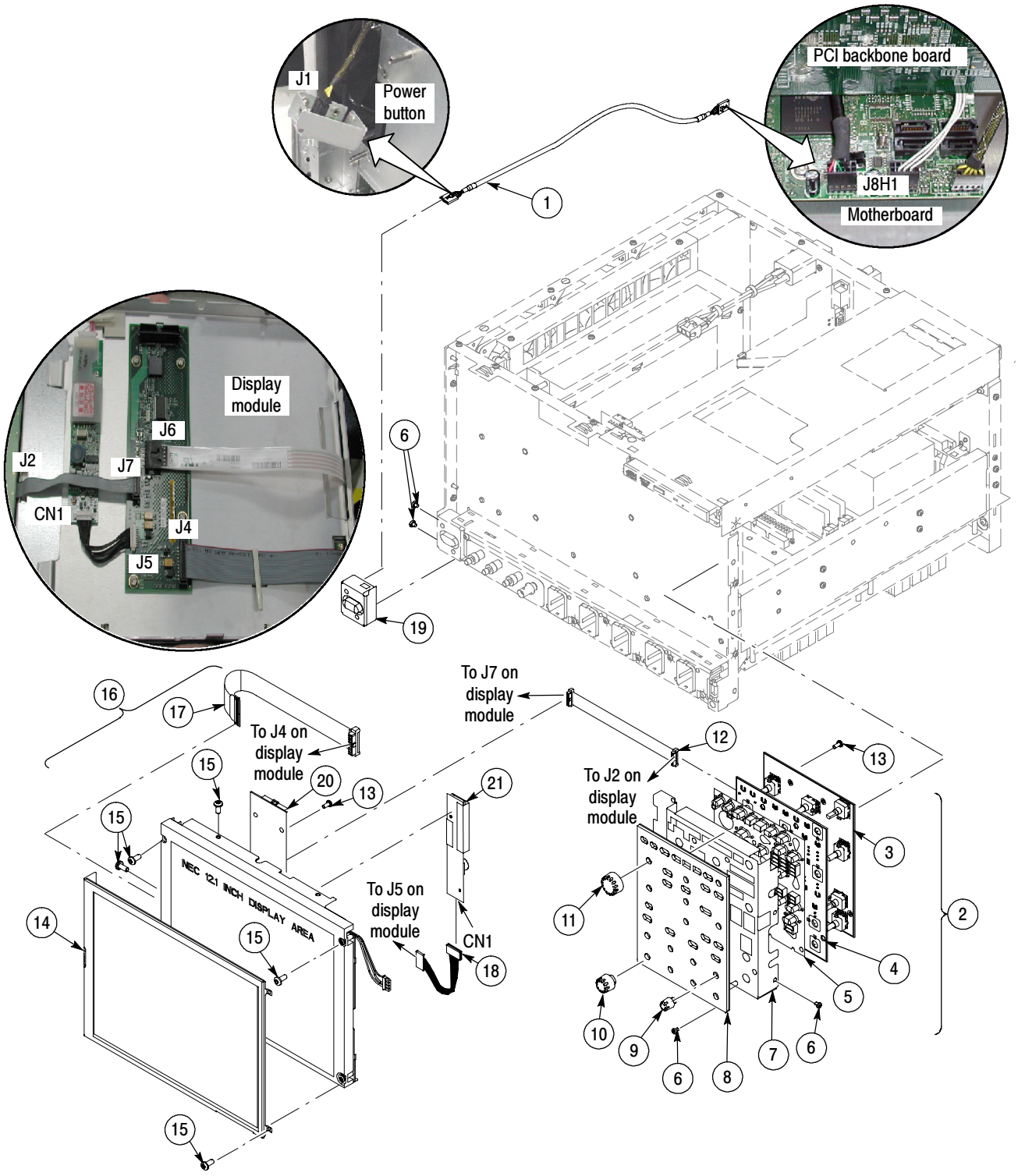



**Figure 5-9: Front panel and display (≥4.0 GHz models)**

## Replaceable parts list ( ≥ 4.0 GHz models)

| Fig. & index number | Tektronix part number | Serial no. effective | Serial no. discont'd | Qty | Name & description |
|---|---|---|---|---|---|
| 10-1 | 119-6982-00 | | | 1 | POWER SUPPLY: AC-DC;1200W,+48V 25A, +12V 1A, 85-264VAC, 47-63HZ,ELCON 377-0002-00100A, IEC320-C22;11.5X6.75X2.75IN;CLOSED CHASSIS |
| -2 | 211-1050-00 | | | 12 | SCREW,MACHINE;6-32X0.312 L,PNH,STL CAD PLT,T15 |
| -3 | 436-0422-00 | | | 1 | TRAY,FAN; CHASSIS ASSY,W/6 FANS MOUNTED;HAMMERHEAD |
| -4 | 441-2497-00 | | | 1 | CHASSIS;MAIN |
| -5 | 335-1634-00 | | | 1 | LABEL,CHASSIS,REAR COSMETIC |
| -6 | 335-0263-01 | | | 1 | MARKER,IDENT; SUPER LABEL,BLANK ROLL STOCK |
| -7 | 335-0347-00 | | | 1 | MARKER,IDENT; REAR PANEL,BLANK,2.100 X 2.700 |
| -8 | 065-0759-01 | | | 1 | CIRCUIT BOARD; POWER DISTRIBUTION |
| -9 | 343-1585-00 | | | 1 | CLAMP; WIRE ROUTING CLAMP,FLAT CABLE BLIND HOLE MOUNTED,NYLON |

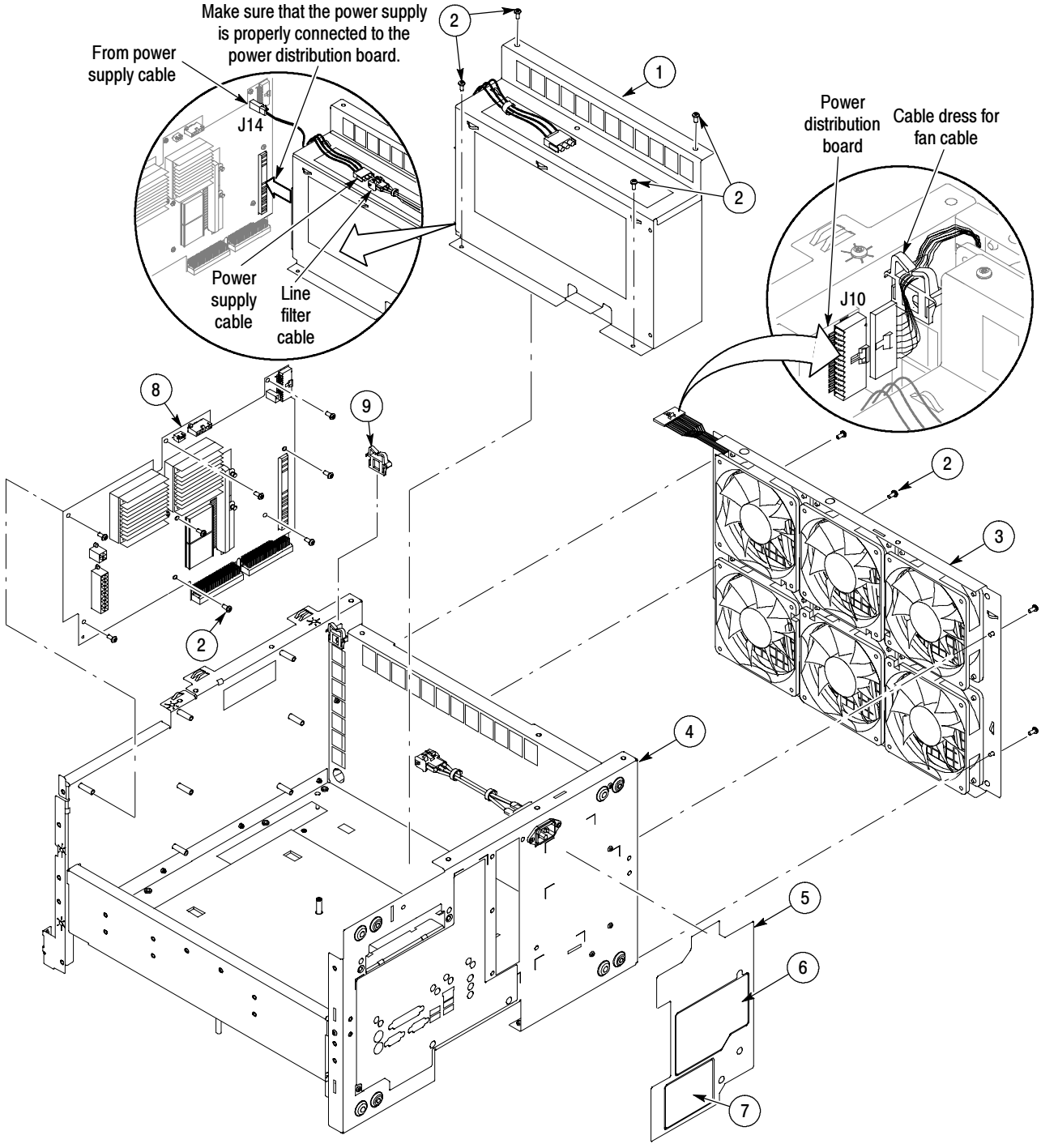



**Figure 5- 10: Power supply and fans ( ≥ 4.0 GHz models)**

## Replaceable parts list ( ≥ 4.0 GHz models)

| Fig. & index number | Tektronix part number | Serial no. effective | Serial no. discont'd | Qty | Name & description |
|---|---|---|---|---|---|
| 11-1 | 174-4797-00 | | | 1 | CA ASSY; 20 PIN ATX POWER,SAFETY CONTROLLED |
| -2 | 065-0745-02 | | | 1 | SERVICE KIT FOR CPU BRD, CPU, FAN AND HEAT SINK ASSEMBLY |
| | 167-0657-00 | | | 1 | PROCESSOR;PENTIUM 4, 3.4 GHZ INTERNAL CLOCK,400MHZ BUS,W/O FAN HEATSINK,HH80552PG0962M |
| | 119-7333-00 | | | 1 | FAN, HEATSINK AND BRACKET |
| -3 | 211-0935-00 | | | 8 | SCREW,MACHINE; 6-32 X 0.50,PNH,T-15,SST,PASSIVATED |
| -4 | 174-4798-00 | | | 1 | CA ASSY; 4 PIN P4 POWER |
| -5 | 039-0173-00 | | | 1 | COMPUTER BOARD; PENTIUM 4,BOARD, UATX,TAPPEN,GIG E, PROCESSOR LGA775,DDR2 667MHZ,TOTAL 4 GIG;BLKD945GTPLKR |
| -6 | 167-0429-00 | | | 2 | IC,MEMORY;128M X 64,1GB DDR2 1.8V,3-3-3;MT16HTF12864AY-40E,DIMM240,DS1 |
| -7 | 119-7333-00 | | | 1 | HEATSINK AND BRACKET |
| -8 | 361-1834-00 | | | 1 | DAMPENER,PORON FOAM FOR P4 HEATSINK |
| -9 | 174-5271-00 | | | 1 | IDE CABLE WITH STRAIN RELIEF & PULL-TAB |

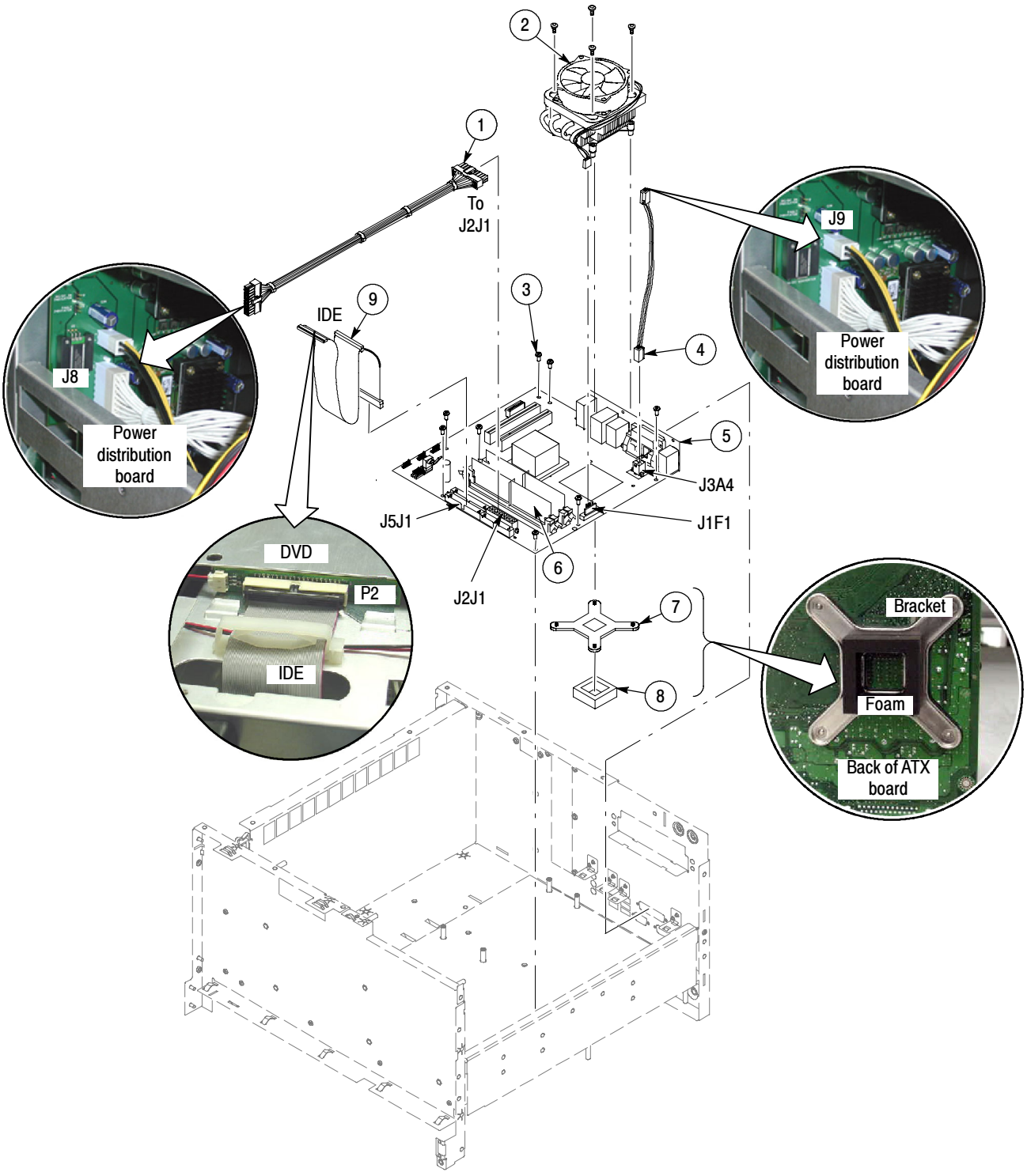



**Figure 5- 11: Atx assembly ( ≥ 4.0 GHz models)**

## Replaceable parts list (>2.5 GHz models)

| Fig. & index number | Tektronix part number | Serial no. effective | Serial no. discont'd | Qty | Name & description |
|---|---|---|---|---|---|
| 12-1 | 214-3903-00 | | | 8 | SCREW,JACK; 4-40 X 0.312 LONG,0.188 H HEX HEAD STAND OFF,4-40 INT THD, X 0.312 THD EXT 4-40 |
| -2 | - - - - - - - | | | 1 | ACQUISITION MODULE,RETURN TO TEKTRONIX FOR SERVICE |
| -3 | 211-0752-00 | | | 10 | SCREW,MACHINE; 6-32 X 0.75,PNH,TORX |
| -4 | 211-1050-00 | | | 7 | SCREW,MACHINE; 6-32 X 0.312 L,PNH,STL CAD PLT,T15 |

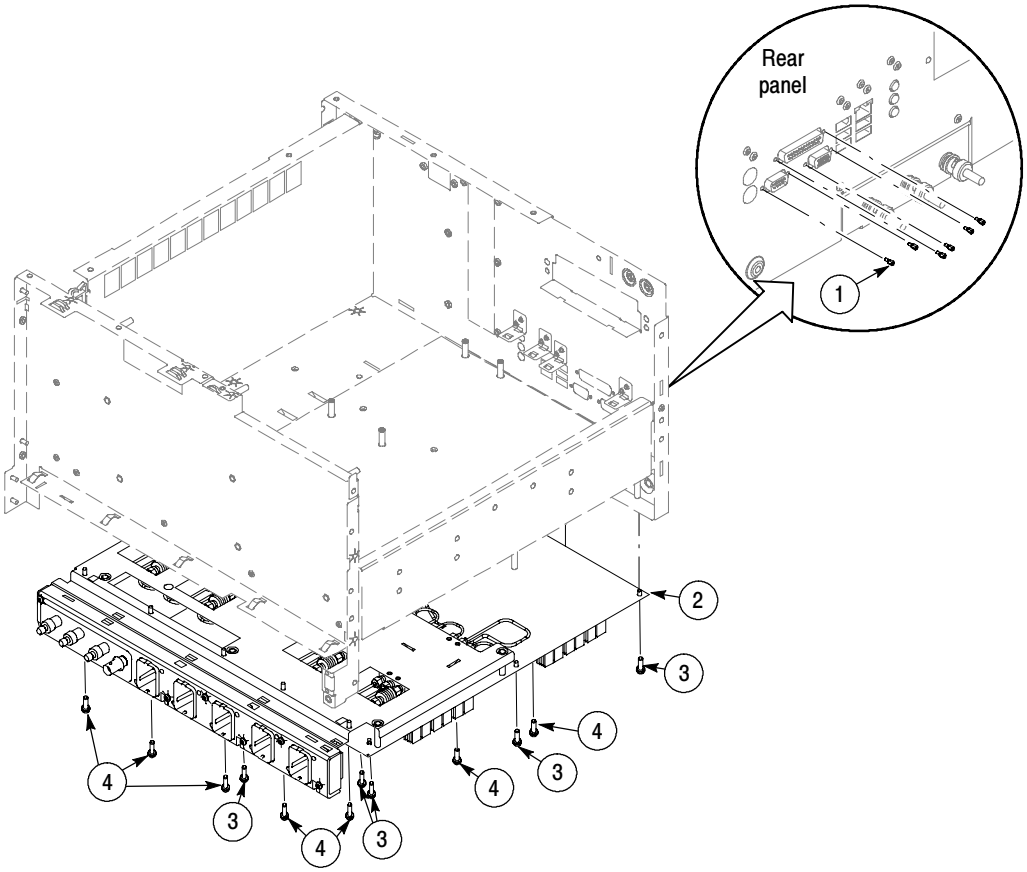



**Figure 5-12: Acquisition assembly ( ≥ 4.0 GHz models)**

## Replaceable parts list ( ≥ 4.0 GHz models)

| Fig. & index number | Tektronix part number | Serial no. effective | Serial no. discont'd | Qty | Name & description |
|---|---|---|---|---|---|
| 13-1 | 065-0758-00 | | | 1 | CIRCUIT BD ASSY; PCI BACKBONE BOARD |
| -2 | 211-1050-00 | | | 6 | SCREW,MACHINE; 6-32 X 0.312 L,PNH,STL CAD PLT,T15 |
| -3 | 335-1604-00 | | | 1 | LABEL REAR I/O PLATE, SAFETY CONTROLLED |
| -4 | 214-3903-00 | | | 2 | SCREW,JACK; 4-40 X 0.312 LONG,0.188 H HEX HEAD STAND OFF,4-40 INT THD, X 0.312 THD EXT 4-40 |
| -5 | 211-1206-00 | | | 2 | SCREW,JACK; 2-56 ID X 4-40 OD,0.188 HEX,SS |
| -6 | 214-1061-00 | | | 2 | CONTACT,ELEC; GROUNDING,CU BE SAFETY CONTROLLED |
| -7 | 386-7447-00 | | | 1 | PLATE; REAR, PCI I/O |
| -8 | 174-5164-00 | | | 1 | CA ASSY;USB 2.0 |
| -9 | 679-6107-00 | | | 1 | CIRCUIT BD ASSY; USB |
| -10 | 211-1221-00 | | | 2 | SCREW;M2.0 6-MM LONG PHILLIPS FLATHEAD ZINC-PLATED |
| -11 | 174-5048-00 | | | 1 | CA ASSY;USB 1.0 |
| -12 | 174-4241-00 | | | 1 | CABLE ASSY; RIBBON,BUS,IDC,32 AWG,16.50 L,60POS,BOX,IDC,FEMALE,RTANG,0.050CTR X 2 |
| -13 | 386-7481-00 | | | 1 | BRACKET, BRACE BETWEEN PCI PCB AND DRIVE BRACKET |

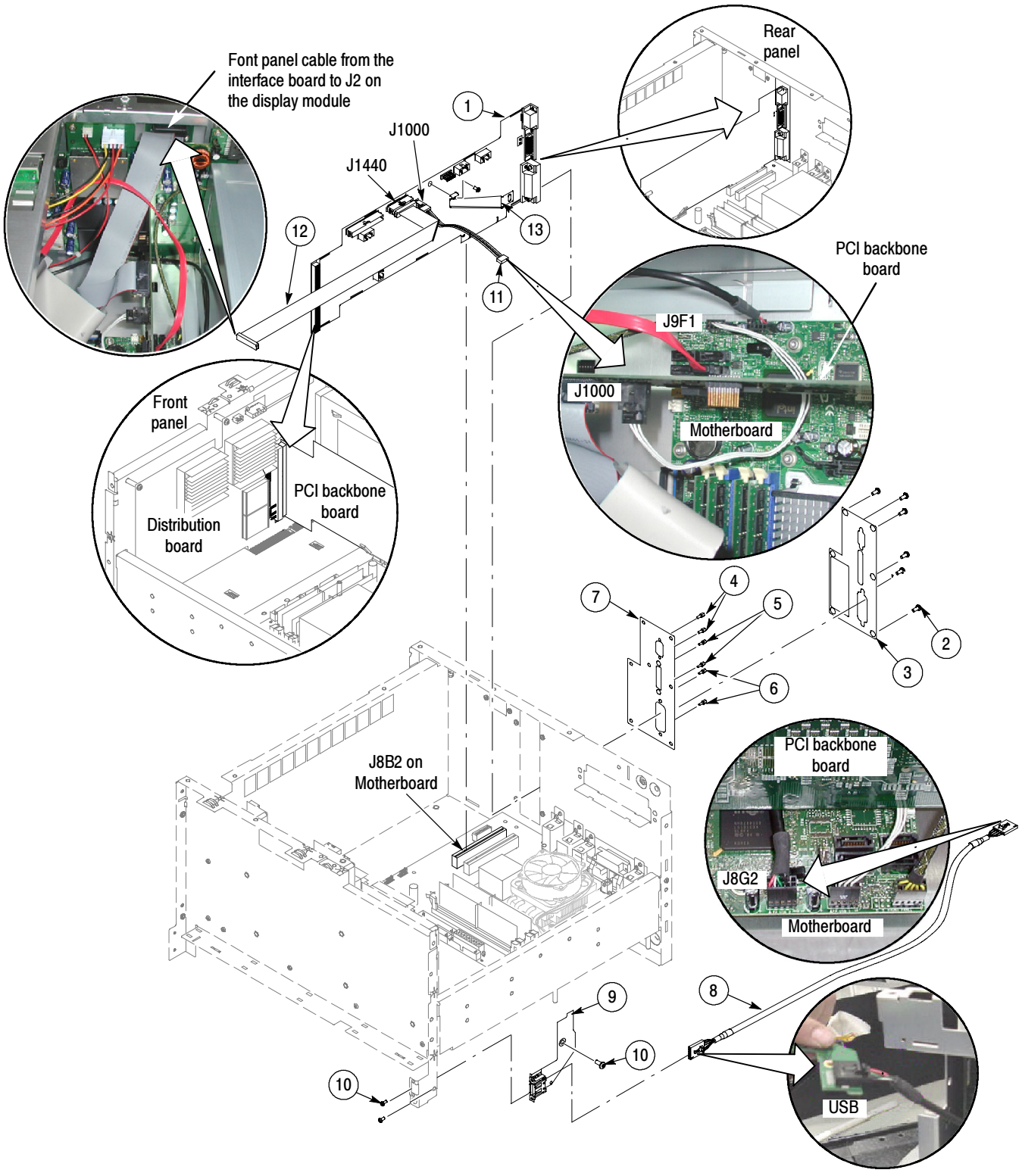



**Figure 5- 13: Interface board ( ≥ 4.0 GHz models)**

## Replaceable parts list ( ≥ 4.0 GHz models)

| Fig. & index number | Tektronix part number | Serial no. effective | Serial no. discont'd | Qty | Name & description |
|---|---|---|---|---|---|
| 14-1 | 065-0755-00 | | | 1 | DISK DRIVE ASSY KIT,UNPROGRAMMED 119718900 |
| -2 | 211-1050-00 | | | 8 | SCREW,MACHINE; 6-32 X 0.312 L,PNH,STL CAD PLT,T15 |
| -3 | 407-5069-00 | | | 1 | BRACKET,RHDD; SATA COMBO CABLE,3.5 INCH REMOVABLE HARD DISK DRIVE RECEPTACLE |
| -4 | 174-5169-00 | | | 1 | CABLE ASSY; SATA COMBO,HARD DRIVE CABLE |
| -5 | 174-5017-00 | | | 1 | CABLE ASSEMBLY; DVD POWER |
| -6 | 679-5915-00 | | | 1 | CKT BD SUBASSY; DVD-CD/RW ADAPTER,UNTESTED,389-3689-00 WIRED |
| -7 | 129-1618-00 | | | 1 | SPACER; DVD-CD/RW SLIMLINE DRIVE ADAPTER,PLASTIC |
| -8 | 211-0950-00 | | | 4 | SCREW,MACHINE; M2X.4X3L,PHL, PNH, STL NI PL |
| -9 | 407-5156-00 | | | 1 | BRACKET,DVD-CD/RW;ADAPTER FOR DVD-CD/RW SLIMLINE |
| -10 | 119-7196-00 | | | 1 | DISK DRIVE;OPTICAL,644MB,CD-RW/DVD ROM,COMBO,16.7 MB/SEC,IDE/ATA-PI;DW-224E-C93 |
| -11 | 441-2496-00 | | | 1 | CHASSIS;DRIVE BAY;METAL |

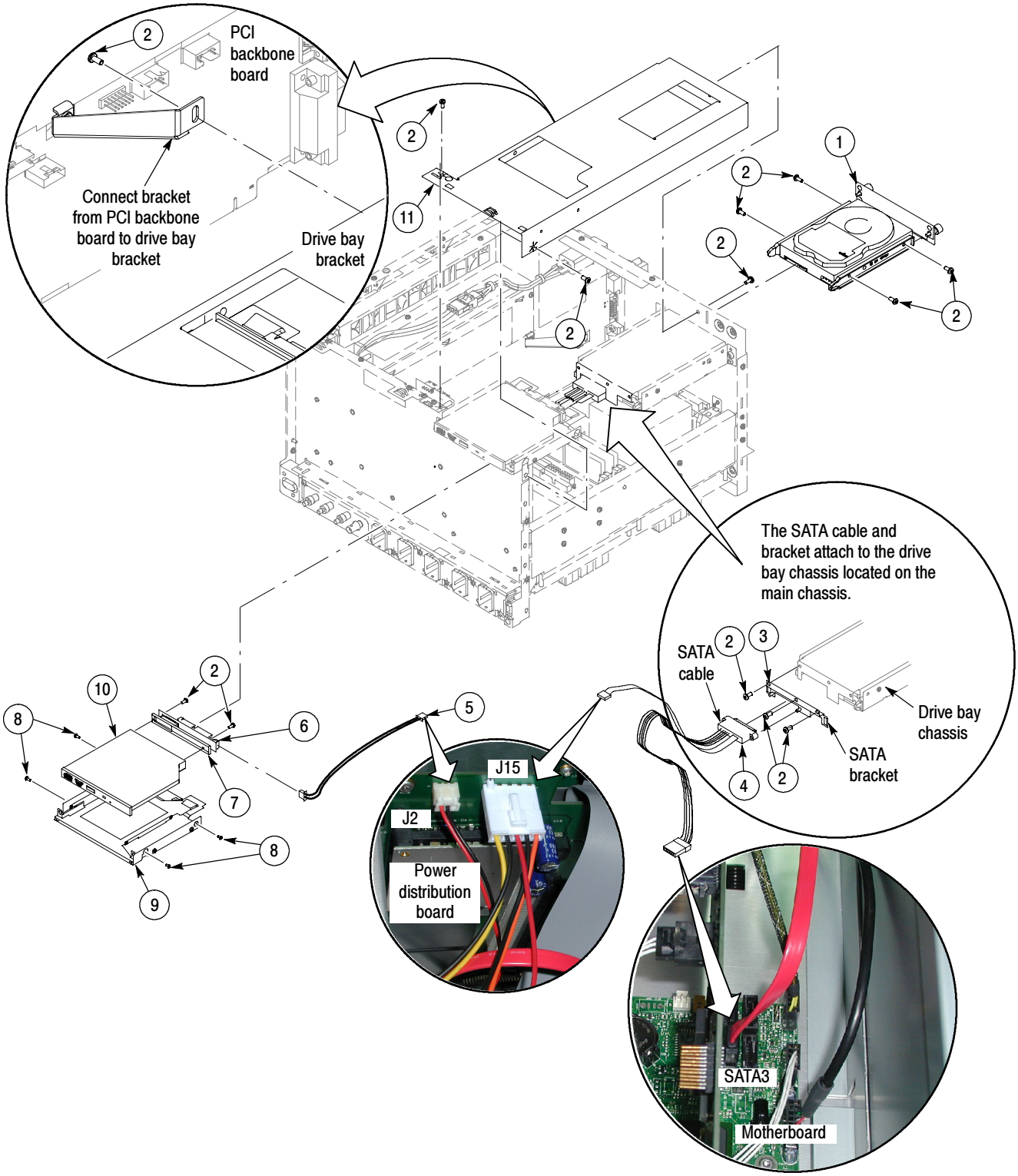



**Figure 5- 14: Drives (≥ 4.0 GHz models)**

## Replaceable parts list ( ≥ 4.0 GHz models)

| Fig. & index number | Tektronix part number | Serial no. effective | Serial no. discont'd | Qty | Name & description |
|---|---|---|---|---|---|
| | | | | | **Standard Accessories** |
| | See Description | | | 1 | CABLE ASSY, POWER:<br>OPTION COUNTRY P/N<br>A0 N. AMERICA 161-0213-00<br>A1 UNIV EURO 161-0209-00<br>A2 UK 161-0210-00<br>A3 AUSTRALIA 161-0211-01<br>A5 SWITZERLAND 161-0212-00<br>A6 Japan 161-0213-00<br>A10 CHINA 161-0320-00<br>A11 INDIA 161-0325-00 |
| | See Description | | | 1 | QUICK START USER MANUAL<br>OPTION LANG P/N<br>L0 ENGLISH 071-1733-XX<br>L1 FRENCH 071-1734-XX<br>L3 GERMAN 071-1735-XX<br>L5 JAPANESE 071-1736-XX<br>L7 CHINESE, S 071-1738-XX<br>L8 CHINESE, T 071-1743-XX<br>L9 KOREAN 071-1737-XX<br>L10 RUSSIAN 071-1739-XX |
| | 020-2659-02 | | | 1 | OS RESTORE CD AND INSTRUCTIONS |
| | 020-2693-03 | | | 1 | PRODUCT SW CD AND INSTRUCTIONS |
| | 161-0218-00 | | | 1 | CABLE ASSY,PWR; 3,14 AWG,100 L,SJT,BLK,60 DEG C,5-20P X BME-3S,15A/125V |
| | 119-7083-00 | | | 1 | POINTER ASSY;MOUSE,MICROSOFT BLACK OPTICAL WHEELED,USB AND PS2 |
| | 119-7054-00 | | | 1 | KEYBOARD;USB W/ 2-PORT HUB; MINI (69 KEYS) BLACK |
| | 071-0730-04 | | | 1 | MANUAL,TECH;INSTRUCTION,PROBE CAL DESKEW FIXTURE,067-0405-02 |
| | 071-1768-01 | | | 1 | MANUAL,TECH;INSTRUCTION,DESKEW FIXTURE |
| | 071-1733-01 | | | 1 | MANUAL,TECH;QUICK START,ENGLISH |
| | 020-2700-00 | | | 1 | CD;OPTIONAL APPS |
| | TCA-292MM | | | 4 | ADAPTER;TEKCONNECT,2.92MM |
| | TCA-BNC | | | 4 | ADAPTER;TEKCONNECT,BNC |
| | 200-4963-00 | | | 1 | COVER;FRONT |
| | 067-0484-03 | | | 1 | FIXTURE;PROBE CAL,DESKEW,DSA/DPO70404 ONLY |
| | 067-1586-00 | | | 1 | FIXTURE;PROBE CAL,DESKEW,DSA/DPO70804 AND DSA/DPO70604 ONLY |
| | 063-3781-00 | | | 1 | CD;NERO,DVD WRITER SW |